

# Journal

## OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

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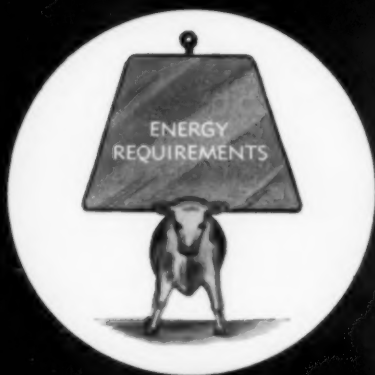


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\$15.00 per Annum

Single Copies, \$ .75 Prepaid in U.S.

Canada and Pan American Countries, \$15.50; Foreign, \$16.50

Published semimonthly at 600 S. Michigan Ave., Chicago 5, Ill., by the American Veterinary Medical Association. Second class mail privileges authorized at Chicago, Ill., January, 1956. Additional entry at Mendota, Ill.



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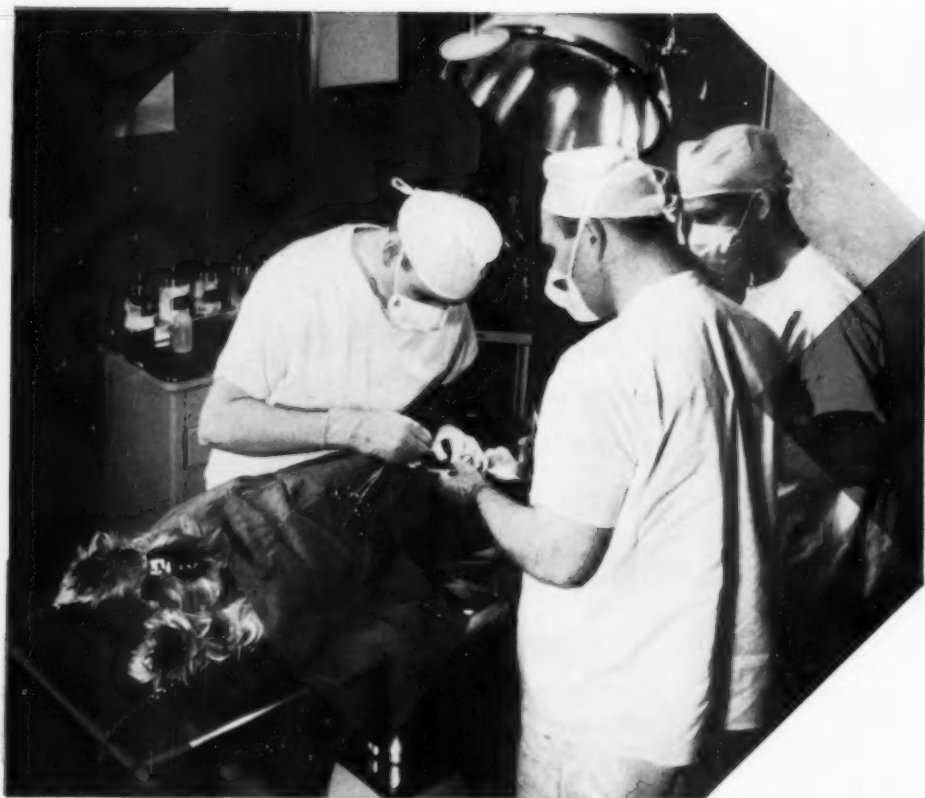


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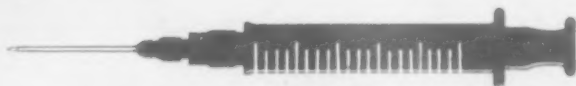
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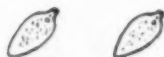
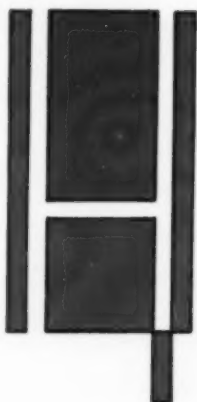
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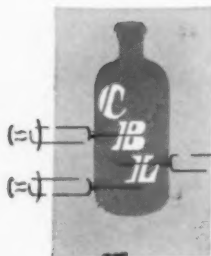
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## News From Washington



The AVMA House of Representatives instructed the Association's Washington representative to work toward the amendment of H.R. 7225 to exclude self-employed veterinarians from the provisions of this legislation when it is considered by the Senate of the United States.

Following is the statement of the AVMA re. H.R. 7225, 84th Congress, to the Committee on Finance, United States Senate, by J. A. McCallam, on Jan. 27, 1956.

### MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE:

I am James A. McCallam, Brig. Gen. U.S.A. (Retired), a past-president of the American Veterinary Medical Association, and formerly a member of the Executive Board. Currently, I am the Washington representative, and am appearing today on behalf of the Association in connection with H.R. 7225, Social Security Amendments of 1955. My testimony will be directed primarily toward Section 104(d) of the subject bill.

Under Section 211(c) (5) of the Social Security Act, professional service performed by any self-employed person as a physician, lawyer, dentist, veterinarian, among others, is excluded from the definition of the term "business or trade" for purposes of determining "net earnings from self-employment." Thus, the veterinarian, among others in that grouping, is excluded from coverage under the law.

Section 104(d), H.R. 7225, would eliminate the exclusions referred to — the professional self-employed — except in the case of the doctors of medicine, i.e., the self-employed physician.

The American Veterinary Medical Association has opposed compulsory coverage of veterinarians under the Social Security Act. Our position has not changed. In August, 1955, at the 92nd Annual Convention, delegates to the House of Representatives of the AVMA, representing their state associations, voted to oppose the compulsory coverage of veterinarians, as provided in H.R. 7225, and directed appropriate action be taken by the Association to effect the exclusion. This action of the delegates is a reiteration of the position taken by the Association during the 83rd Congress when an attempt was made to

include the self-employed veterinarian in the Social Security amendments of 1954.

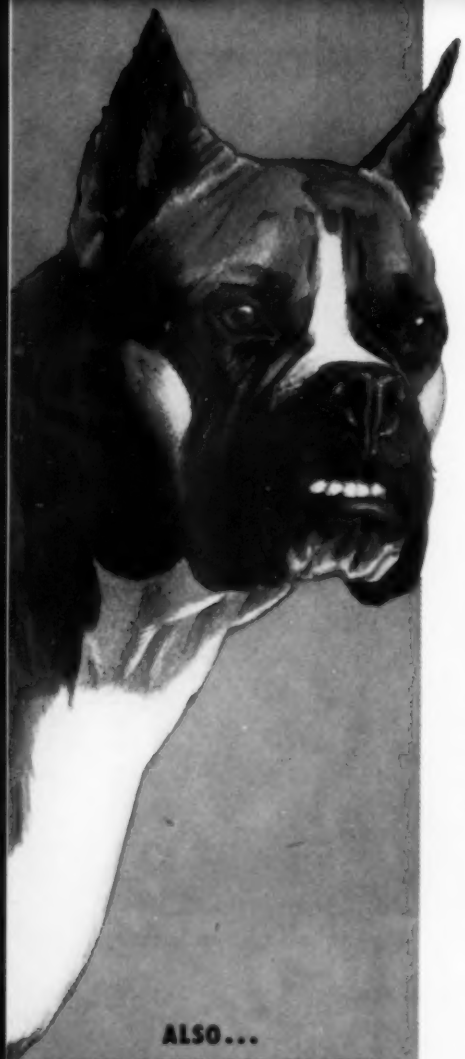
Since the House Committee did not hold public hearings when considering H.R. 7225, we do not know the reasons for including the veterinarian. Nor are the reasons known why the doctor of medicine is excluded. However, on June 1, 1954, during debate in the House of Representatives on the Social Security Amendments of 1954 (Congressional Record, June 1, 1954, p. 7021), it was pointed out that physicians were excluded because they do not retire at age 65. They continue working, therefore they (presumably the House Ways and Means Committee) did not think it would be fair for them to be required to pay the tax when they did not expect to retire and get benefits.

Gentlemen, we agree with that determination, and the reason given is equally applicable to the self-employed veterinarian. Only a very small proportion of practicing veterinarians consider age 65 as the demarcation between their working years and complete retirement. They are not forced into abrupt retirement. They prefer to continue practicing, although tapering off as they grow older.

I should like to emphasize that the number of veterinarians in this country is insufficient to meet the demands for veterinary service. Veterinarians recognizing their obligation to serve agriculture and the welfare of the public through protecting livestock against animal diseases, are reluctant or even find it impossible to refuse to render service to those with whom they have been associated during the earlier years of their professional careers. The majority of veterinarians are located

*Continued on adv. p. 20*





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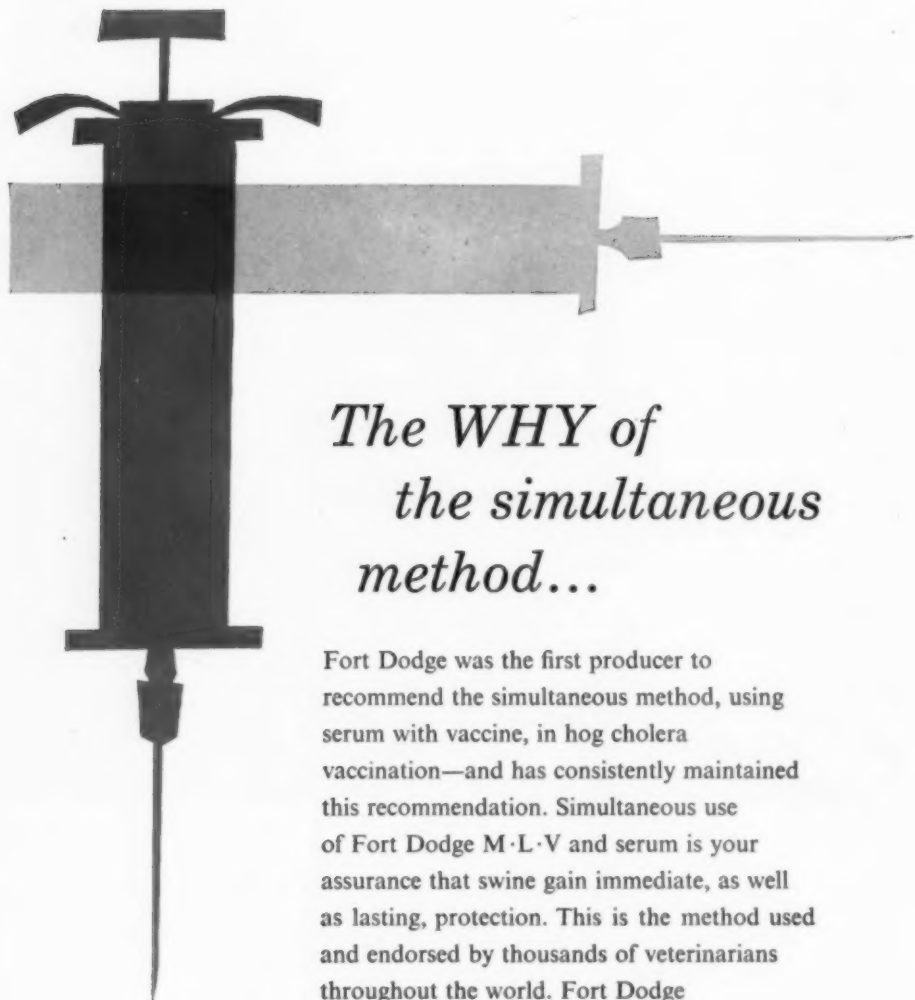
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# JOURNAL

of the American Veterinary Medical Association

Chicago 5, Illinois

Vol. 128

FEBRUARY 15, 1956

No. 4

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## Canine Prostatectomy

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THE ANATOMICAL position of the prostate of the dog has made it a difficult organ to approach surgically. In spite of this, many workers have evolved techniques for prostatic surgery which, in their hands, have proved successful.

### LITERATURE CITED

McKee<sup>1</sup> described a pararectal approach. Gadd<sup>2</sup> effectively treated prostatic hyperplasia by excising a portion of the capsule through a suprapubic incision. Marcenac<sup>3</sup> reported that the perineal route may be used in this operation, but stated his preference for a prepubic approach. Sparks<sup>4</sup> reduced the size of the canine prostate by shaving or slicing tissue from the outer part of the gland. Parascandola's<sup>5</sup> method consisted of removing both the bladder and the prostate gland and anastomosing the ureters to the rectum. Lamy<sup>6</sup> evolved two separate techniques in removing prostatic tissue. Both methods utilized either electro- or thermocautery to aid in hemostasis. In the first, the disseminate portion of the gland which had become raised above the surface of the neck of the urinary bladder was destroyed. The second method consisted of incising longitudinally the capsule of the gland on the ventral median line. The capsule was folded back laterally on either side and the parenchyma of the gland was resected bit by bit. The two flaps of the capsule were then sutured together. Where the capsule was too large following removal of the glandular tissue, the redundant portions were cut off.

Matera,<sup>7</sup> in his thesis,<sup>8</sup> presented a classical work on the surgery of the canine prostate gland. He designed a perineal approach. By entering the body cavity through the ischioanal fossae and exerting tension on the bulbocavernosus muscle which overlies the urethra, he found it possible to withdraw the prostate gland into the perineal

incision. The prostate gland was separated from the bladder, then from the urethra. An end-to-end anastomosis between the neck of the bladder and the urethra completed the operation.

### DISCUSSION

The number of surgical techniques, which have been described in the veterinary literature, designed to reduce the size of the prostate gland of the aging dog must leave the reader wondering why another method is necessary. We would, therefore, set down our reasons as follows:

1) In our opinion, those operations designed to remove a portion of the capsule or to slit the capsule of the gland in order to permit the glandular parenchyma to expand into the abdominal cavity, in most instances, fail to accomplish results of any value.

The outstanding signs of prostatic enlargement in the dog, unlike man, are those of constipation and tenesmus. The constipation and straining are caused by the enlarged gland pressing upon, and in some instances partially occluding, the rectum. Urinary abnormalities, particularly signs of urinary retention or difficulty in the passage of urine, are seldom a feature of prostate enlargement unless the initiating cause is neoplastic in origin. Prostatic hyperplasia in the dog does not usually result in impingement of prostatic tissue into the neck of the bladder or the urethra. Therefore, any operation designed to lessen the pressure of the prostatic parenchyma upon the urinary tract is usually unnecessary.

2) The capsule of the hyperplastic canine prostate is extremely thin, transparent, and vascular. The underlying parenchyma is similarly well supplied with blood vessels. Incision of this capsule and its removal, particularly in those operations where the incised capsule is folded laterally, involves delicate surgical technique to avoid tearing or shredding the capsule. Further difficulty is encountered in attempting to perform a hemostatic operation. The prostatic parenchyma, when

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<sup>8</sup>This, and the personal encouragement of Professor Matera, provided the impetus for the development of the surgical technique which the authors present in this paper.

hyperplastic, is very friable and does not lend itself to hemostatic procedures which involve grasping the bleeding vessels with forceps and later ligating them. That the operation is essentially a bloody one, and therefore likely to result in shock, is indicated by the fact that workers have found it necessary to use electrocautery in performing this type of operation.

3) Most of the surgical procedures which have been attempted remove only a portion of the glandular substance. This, in the absence of other measures to prevent or correct hyperplasia (castration for example), leaves a nucleus of tissue which is capable of growth.

4) Those operations are unsatisfactory which do not permit visualization of the operative field by the surgeon. The extreme vascularity of the affected organ, as well as the large vessels (fig. 1) lying close to the prostate gland, would make any such operation a hazardous undertaking.

5) In the opinion of the authors, the perineal approach of Matera for the complete removal of the prostate is the most satisfactory method previously described. However it has two disadvantages: (a) Direct visualization of the complete prostatic blood supply is difficult, if not impossible; and (b) because a greatly enlarged prostate can not pass through the pelvis, it can not be removed by this route.

6) The method described in this paper,<sup>†</sup> a modification of Matera's technique, has the following advantages: (a) The surgeon is able to see all the structures with which he is dealing at all stages of the operative procedure; (b) it is a completely hemostatic operation; (c) the most

enlarged prostate can be readily removed by this route; (d) all the prostatic tissue, and therefore all pressure whether upon the urinary tract or digestive tract, is removed.

#### OPERATIVE TECHNIQUE

The dog is placed on its back on the table. A catheter of suitable size is passed into the bladder and is permitted to remain in place for 48 hours postoperatively.

The skin incision is made in the midline from the umbilicus to the prepuce. At the prepuce it curves lateral to the penis and extends back over the pubis. Routine hemostatic procedures are employed and the bleeding skin vessels are picked up with forceps and ligated with No. 000 plain catgut. Particular attention should be given to the branch of the caudal superficial epigastric vein which lies in the subcutaneous tissue just posterior to the most anterior part of the prepuce and lateral to the penis. This large vessel should be ligated at two points and divided between the ligatures.

After the penis has been reflected laterally, and the skin towels have been applied, the abdominal cavity is entered by an incision in the linea alba from the umbilicus to the anterior brim of the pubis. A Balfour abdominal retractor is used to spread the wound edges. A soft towel which has been moistened in physiological saline solution is used to "pack off" the intestines into the anterior portion of the abdomen. The urinary bladder, the prostate gland,

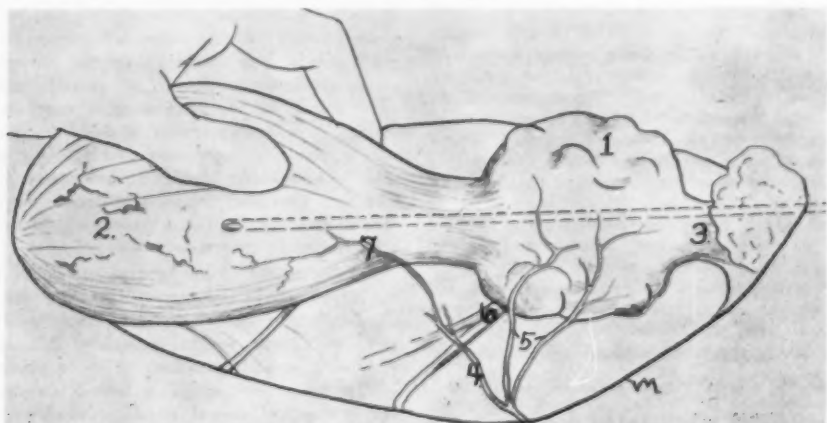


Fig. 1—The anatomical relationships of the canine prostate gland: (1) prostate, (2) bladder, (3) urethra, (4) urogenital branch of the internal iliac artery, (5) prostatic branches of the internal iliac artery, (6) vas deferens, and (7) caudal vesicular artery. The dotted line indicates the presence of a catheter.

<sup>†</sup>This technique was demonstrated via television at the AVMA convention in Minneapolis, Aug. 15-18, 1955.



Fig. 2—The prostatic vessels are ligated and divided between the ligatures. The same is true for the vas deferens. The bladder has been severed from the prostate and the catheter is exposed.

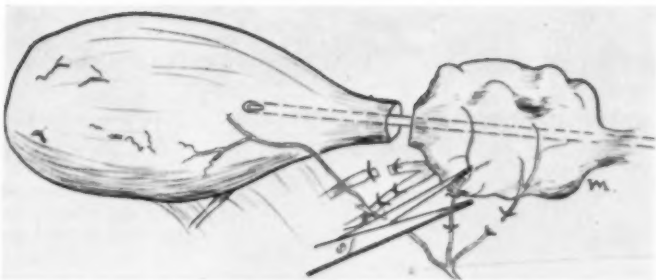


Fig. 3—An Allis forceps is applied to the neck of the bladder to prevent leakage of urine, but without crushing the tissue. The end of the catheter is seen to be outside the bladder. The prostate has been severed from the urethra and is ready to be slipped off the catheter.

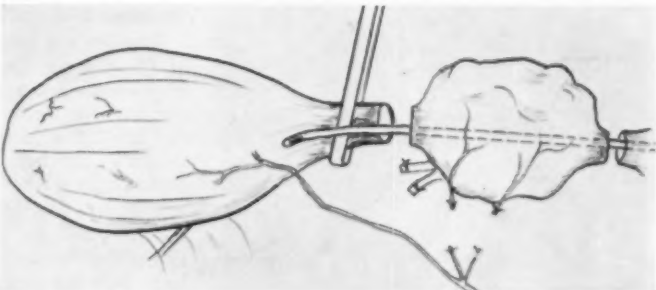


Fig. 4—The catheter has been reinserted into the bladder and interrupted sutures have been placed in preparation for completion of the bladder-urethral anastomosis.

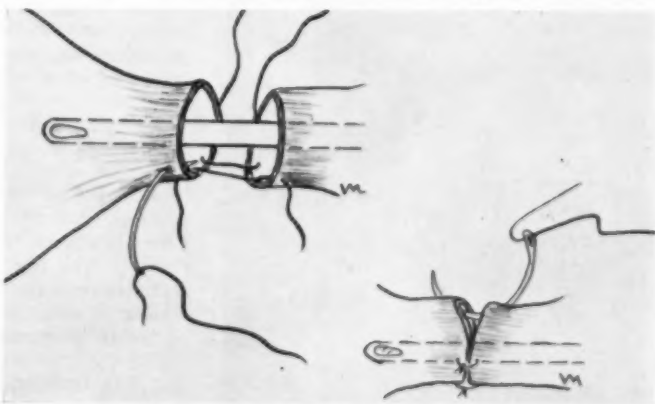
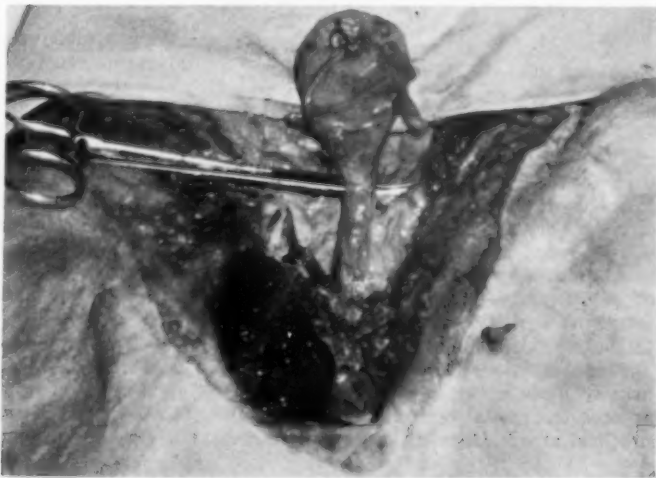


Fig. 5—In an experimental animal, the pubis has been split to expose the urethra and bladder. The forceps show the site of the anastomosis. This animal was destroyed two months following surgery.





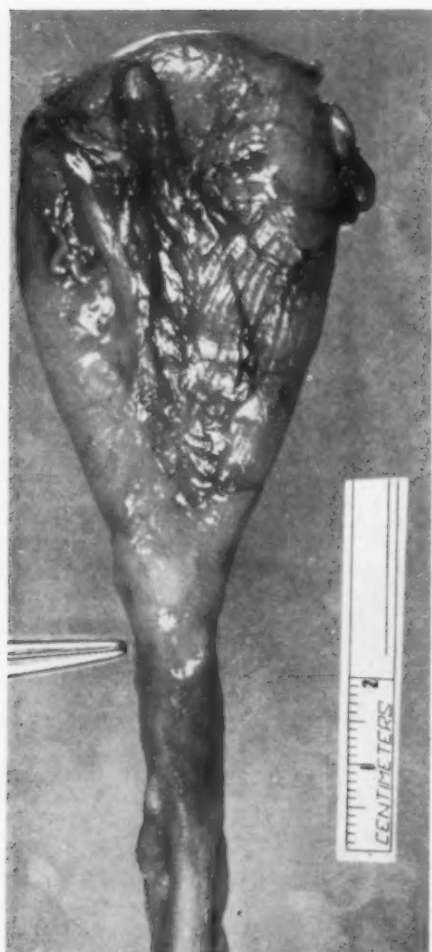


Fig. 6—The bladder and a portion of the urethra of the experimental dog two months following prostatectomy. The forceps point to the site of anastomosis.

and the last portion of the large bowel are thus the only major structures remaining in the operative field.

The bladder and gland are drawn forward to expose the blood supply to the prostate gland which is carried in two folds of peritoneum (one on either side of the prostate) which lie immediately posterior to the lateral ligaments of the bladder.

The prostatic arteries, two on each side, usually arise from the urogenital artery, as does the caudal vesicular artery and the urethral artery (fig. 1). In some instances,

there are more than two prostatic branches and in others a common branch leaves the urogenital artery and splits into two branches somewhere along its course to the prostate gland. The prostatic branches of the vessels are each ligated at two points and divided between the ligatures, care being taken to avoid interference with the vesicular and urethral branches (figure 2).

Scissors are employed to dissect the neck of the bladder from the prostate. Because of the catheter and its characteristic color, the surgeon is aware when entrance into the urethra is made. Allis forceps are used to grasp the neck of the bladder, and the catheter is withdrawn from it (fig. 3).

The prostate is similarly dissected from the urethra and Allis forceps are used to grasp the distal end to prevent its slipping back into the pelvic cavity. The slight hemorrhage from the cut ends of bladder and urethra and the escape of small amounts of urine are easily controlled by slight pressure of a gauze swab on these cut surfaces.

The vasa deferentia, which empty into the urethra on its dorsal surface, are each, with its associated blood vessel, twice ligated before they disappear under the prostate gland. Each is then divided between ligatures. Thus the prostate gland is entirely free from all its attachments and is lifted out of the abdominal cavity by sliding it anteriorly off the "bladder end" of the catheter.

The catheter is reinserted into the bladder. The bladder, which is freely movable, is moved posteriorly to the cut end of the urethra.

Interrupted or continuous sutures (No. 00 chromic catgut) may be used to complete the anastomosis. Simple continuous sutures, one row, have proved to be satisfactory and can be rapidly inserted. The difference in diameter between the neck of the bladder and the urethra is usually so slight as to offer no difficulty in achieving a good end-to-end anastomosis (fig. 4). Figures 5 and 6 show the site of anastomosis in an experimental animal two months after surgery.

#### SUMMARY

A simple and direct method for the surgical removal of the canine prostate gland has been described. The operation requires no special equipment or facilities.

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### Meat Packers Move West

The gradual, consistent western movement of the meat-packing industry is shown by the growth of medium- and small-sized independent meat processors in that area in recent years and by the discontinuance of slaughtering operations in Chicago by Wilson & Co. The reasons are: growing western population, saving in transportation costs, farmers preference for trucking livestock, and smaller costs for expansion of facilities.—*J. Agric. & Food Chem.*, Dec., 1955.

### Antibiotic Injections Damage Meat

Hundreds of pounds of meat had to be trimmed from the carcasses of a shipment of steers because they had been given intramuscular doses of a broad-spectrum antibiotic in an oil base shortly before marketing. Animals thus treated should not be shipped for at least two weeks.—*Successful Farming*, Jan., 1956.

### More Time Spent with Livestock

Farmers average 40 per cent of their time working with livestock compared with 30 per cent 25 years ago, chiefly because there has been more mechanization with crop than with livestock enterprises, but also because the number of livestock has increased at a greater rate than the number of acres farmed. In 1950, 51 per cent of cows in the country were machine-milked—90 per cent in California, 20 per cent in

southeastern states. Machines required one-fifth less time per cow than hand-milking.—*Successful Farming*, Jan., 1956.

### Sheep Raising Is Moving East

Statistics show that sheep production is gradually moving from the range to farm flocks. In the past five years, the percentage increase of breeding sheep was: in the eastern cornbelt, 19; in the western cornbelt, 26; and in the mountain and Pacific states, 3. Production dropped 14 per cent in the South Central region.—*Successful Farming*, Jan., 1956.

### Ulceration of the Abomasum in a Cow

A Guernsey cow developed a mild illness a week after parturition. When first examined, three weeks later, she had a poor appetite, poor milk production, a pulse rate of 72, no ruminal movements, and a slight diarrhea. Rectal palpation and tests for ketones were negative. During the intervening two weeks before death, diarrhea ceased then recurred, the cow licked salt almost continuously, she ate little except "dung, dirty straw, and dirt," and rumination was not observed. Her erythrocyte count fell from about 4 million to 3 million and the hemoglobin from 12.0 to 9.1 Gm./100 ml.

On necropsy, an ulcer in the greater curvature of the abomasum was found to have perforated the wall into a "fist"-sized cavity formed by adhesions of the omentum. The necrotic base of the ulcer was packed with fungus. There was no displacement of the abomasum (see *JOURNAL*, Sept., 1955: 214).—*Vet. Rec.*, Oct. 8, 1955.

[A similar perforation and formation of a peritoneal pouch was seen in a horse years ago. The animal was ill for several days and showed no acute pain but refused feed and, despite laxative therapy, the rear gut remained empty. Necropsy revealed a rupture in the wall of the ileum along the mesenteric attachment with the considerable ingesta forced out between the peritoneal layers of the mesentery.—Ed.]

Broilers were marketed at 9 to 10 weeks of age the first half of 1955 in the Del-Mar-Va area but when prices then improved, many were fed until 11 to 12 weeks of age.

## Blaine's History of Veterinary Medicine to 1800

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THIS ACCOUNT of earlier veterinary history appears in the introductory chapters of "Outlines of the Veterinary Art" by Delabere Blaine, professor of animal medicine, London, 1802. Although this work went through five editions in the 40 years following its publication, it seems to have been disregarded generally by later writers on veterinary history. This article is a considerably condensed and edited version, but every effort has been made to retain the original author's style; his own phraseology has been maintained or paraphrased throughout.

Delabere Blaine was a nongraduate veterinarian who was trained as an apprentice and assistant to a surgeon and apothecary; later, he served in the borough hospitals for two years. At the age of 23, he was appointed assistant to the first professor of veterinary medicine in the newly established Veterinary College of London (1791). In this capacity he served as a translator, anatomical demonstrator, and professional assistant for one year. His removal from this position was occasioned by "some impolitic attempts to convince the professor that his anatomical ideas were incorrect." Following this, Blaine gave public lectures on the anatomy and diseases of the horse and engaged in veterinary practice; this was in the custom of a number of others whose earlier training had been in human medicine. Subsequently, he conducted private experiments in the diseases of horses, cattle, and dogs, and served several tours of duty as artillery surgeon in both medical and veterinary capacities. Upon retiring from army duty, he became a country gentleman, engaging in field sports and writing his "Outlines of the Veterinary Art." Having exhausted his inherited fortune in this manner, he turned to full-time veterinary practice in preference to human medicine, "the market being already overstocked with human surgeons."

By comparison with his professional contemporaries, his writings appear to be relatively conservative and his practice

more rational than that generally extant. He styled himself as the "father of canine medicine" and the "warmest friend of veterinary practice." On the title page of his work, he identified himself as "Veterinary Surgeon" and "Professor of Animal Medicine," the latter in the sense of professing the practice of animal medicine. While Blaine's history is incorrect in certain details, and by modern standards rather sketchy, its significance lies in the fact that it is the first recorded history of veterinary medicine in the English language.

### BLAINE'S HISTORY CONDENSED

*The Early History of Medicine.*—The practice of the healing art must have been nearly coeval with the world; when men became ill, recovery was anxiously longed for, and every means was made to find a remedy. Improvements in the art originated in chance; men formed no experiments. Remedies that had proved beneficial were handed down by tradition, and useful discoveries were written on the paintings, walls, and columns of the temples. As particular persons studied these testimonies and made additions to them, they thus became regular practitioners. The gratuities offered on these occasions were regarded with a jealous eye by the priests who, to confine them among themselves, intermingled their superstitious rites; from these arose the incantations, charms, and amulets which form the practice of every people emerging from barbarism.

This superstition laid the foundation for improvement, for the practice of inspecting the entrails of beasts for an omen and of embalming the dead contributed to the knowledge of the animal frame and of the appearances of health and disease. By degrees, a regular clinical practice was established, founded on the knowledge gained by these means and on the prevailing ideas of the time.

Hippocrates was one of the first who made physic [medical science] rational, and who practiced it with the greatest success. He formed that grand body of Greek medicine which laid the foundation

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of "dogmatic practice" and gained him the title of "father of medicine." His practice was remarkable for its simplicity; he observed diseases attentively and reported their progress, wisely avoiding theory where the grounds were few. In company with Democritus, he engaged in the dissection of animals; the human body, from prejudices of the times, was out of reach. Hence all their anatomical instructions described the parts of animals as applied to the human body.

Hippocrates considered the body as influenced by a general principle called "nature." Nature acts in health and disease; she acts in health to separate the noxious from the innocuous—when the functions are disturbed, disease ensues. Diet and air he reckoned as the principle causes of derangement, and this effect he held to be brought about by an alteration of the humors of the body. In disease, nature still acts and endeavors to reduce the altered humors to their original state. This theory of "humoral pathology" continued for many centuries and to that day (1800) was prevalent in many countries. All the writers in veterinary medicine considered diseases as arising from an affection of the fluids of the body. Hippocrates divided diseases into "epidemic," or those raging in any place affecting numbers at the same time; "endemic," or those which appear peculiar to, and the result of, some particular situation; and "sporadic," or all the general complaints that are not influenced by the two former divisions.

The physicians that followed him did not long continue the simpler and safer plan of observing diseases but entangled themselves in theory. They formed the doctrine of the four elements, with the corresponding qualities of heat, cold, dryness, and moisture, which they supposed accounted for all the changes that took place in the animal body. For 500 years no very eminent character arose, nor any popular theory, until Galen appeared. Although he adopted the practice of Hippocrates, Galen indulged himself in the most extravagant theories in explaining the causes of disease. He believed the proper mixture of the four elements was essential to life and health; disease ensued when one or the other of these preponderated—hence arose the refrigerating medicines, califacients, evacuates, and emollients. The

more sober physicians who continued the practice of Hippocrates, which was founded on observation alone, were styled "empirics," while those who adopted the theories of the times were considered "methodists."

After the downfall of the Roman Empire in the fifth century, the remains of Roman and Grecian learning sheltered itself in the walls of Constantinople, from whence it made its way among the eastern nations. Medicine particularly was cultivated by the Arabians, but throughout Europe the most profound ignorance prevailed for nearly another thousand years. Although the art was cherished by the Arabians, it does not appear to have made any great progress except for the introduction of chemistry. This added much to *materia medica*, something to therapeutics, but little or nothing to anatomy and surgery.

As the liberal arts became encouraged again in Europe, in the fifteenth century, the practice of the Arabians became the guide of physicians. From the Greek language, it was discovered that their learning was gained from Hippocrates and Galen with addition of some few opinions from chemistry. Medicine became studied and practiced after the manner of those great masters, but early in the sixteenth century the followers of medicine again divided into two sects: the "galenists," and those who adopted a chemical mode of reasoning. Paracelsus seems to have been the father of the latter, and by efficacy of his prescriptions gained many followers. His experiments introduced the knowledge of many new and powerful remedies which, though used at first with too much boldness, were of great advantage to the art.

Anatomy during this time was making but slow progress, for the custom of embalming was now nearly extinct, the practice of inspecting the entrails of animals entirely so, and the prejudices against dissecting the human body remained in full force. Nevertheless a considerable body of information was handed down by Hippocrates and Galen, the latter being styled the "father of anatomy." Due to the cultivation of painting, it frequently happened that a mistaken public would permit the dissection of bodies for this purpose and refuse them for the nobler intent of teaching the healing art. The art of Leonardo da Vinci is a strong instance of this, and likewise the figures of Vesalius' anatomy which were designed by Titian. With the

cultivation of anatomy, the art of surgery became much improved, and during the sixteenth century it assumed a much more scientific and systematic form.

*The Rise of Veterinary Medicine.*—Animals, when domesticated and removed from a state of nature, would not long continue with unremitting health, and hence their owners would be led to search for such remedies as their small stock of information pointed out. Thus veterinary medicine must have been, in some degree, coeval with the domestication and knowledge of animals. Most of those who early were eminent veterinarians were first physicians or surgeons; in early ages, the two arts probably were practiced indiscriminately by the same person. As man beheld his own diseases removed or lessened, he would be led to employ similar means in the complaints of the animals under his care.

When a people were celebrated for the care of their animals, it is but just to infer that this art must have been cultivated among them. In 900 B.C., Homer celebrated the care of the Greeks for their horses. At this period, the care of diseased animals fell to a particular set of persons. Xenophon, a Greek philosopher and poet, wrote a treatise on equitation, "*De Re Equestri*," about 400 B.C. in which he quotes several authors who had treated on the same subject long before. Hence the treatment of diseases of the horse must have assumed a regular form long before this.

The term "veterinary" appears to be a very ancient one, as may be learned from the relics of literature saved from the devastations of the barbarous ages. In these, the terms "*veterinarius*" and "*veterinarius medicus*" are frequently seen. It appears to be derived from the Latin appropriate to beasts of burden, *veterina ad vecturam idonea*. The ancient etymologists have it *venterina* because it was to the venter, or belly, that pack fastenings were made. Hence veterinary medicine signifies, properly, the treatment of diseases of animals used for burden. The ancient and honorable name of "*veterinarius*" (whence veterinarian), sanctioned by the classics of the Augustan age, became lost in the more humble appellation of "*farrier*" (earlier *ferrier*), derived from the metal on which he worked. For a long period, the ignorance of the horseshoer and the meanness of his title remained indissoluble.

It was not until the time of Hippocrates that veterinary medicine made any advance of consequence. Hippocrates, himself, wrote a treatise on the curative treatment of horses, nor did he disdain, in common with the eminent human practitioners of his day, to practice indiscriminately on the horse and its rider.\* By the investigations of Hippocrates and Democritus, attention was turned in some degree toward anatomy. As these researches were carried out on animals, it is evident that the investigators must have become acquainted with the animal frame in a healthy state. Opportunities for studying morbid anatomy must have led insensibly to attempts at counteracting disease; hence, the veterinary art must necessarily have made some considerable progress.

Veterinary art was deemed, at this early time, highly important and honorable, and it was as regularly practiced as human medicine, not only by physicians in general but probably by persons set apart for the purpose. We have not however, any written remains on the subject until after the Christian era, from the beginning of which we have several fragments. Valerius Maximus mentions Herophilus, a farrier, *equarius medicus*, who had written, but his works have not been preserved. Fifty years after the birth of Christ, Columella wrote his celebrated treatise in which he mentions an eminent contemporary of his, Pelagonius, who had likewise written, but of whose works we have no remains.

From this time until the third century, we have nothing transmitted to us but the names of some of those who either taught or practiced this art. Nevertheless, these testimonies are sufficient to show that from the earliest ages veterinary medicine was of the highest estimation. In ancient times, the importance of any subject was depicted by fable; so this branch of the healing art was said to be derived from the gods. Chiron, who is said to have been the preceptor of Esculapius, is represented as a centaur—half man and half horse—signifying that his care extended equally over man and beast.† Remarks on the dis-

\*Blaine has confused Hippocrates, the physician, with another Hippocrates, a veterinarian who lived several centuries later. There is no evidence that the earlier Hippocrates practiced veterinary medicine, rather he was said to disdain it.

†Blaine has apparently confused the mythological Chiron with the veterinarian of the same name. This error, as well as the allusion to Hippocrates, is common in early writings.



eases of animals were permitted to be written on the walls of the temples with other branches of useful learning.

About 300 A.D. Vegetius, the true father of this art, appeared. He was the veterinary Hippocrates,\*\* who wrote his "Vegetii, Artis Veterinariae." This book was the oracle of many succeeding ages, and upon it many future improvements were built. How great his attention to the subject must have been, and how accurate his observations, may be gained from the following account which he gives of fever: "A horse attacked with a fever hangs his head, extends his eyes, with lips relaxed and pendant. He has a dull heavy air, his body moves with difficulty, and his testicles are loose and pendulous. In these cases the legs are usually hot, his arteries beat strongly, and his breathing is very quick, with hot breath and frequent cough. He staggers in his pace, loathes his food, but has great thirst and sleeps not at all."† The cause of fever he attributes to excessive fatigue, to the crudity of his food, or to perspiration suddenly checked. The cure he recommends is bleeding, abstinence, and pure air, with slight and gentle exercise. Whoever will compare this with many subsequent authors will find that not much had been gained since his time, but on the contrary that the science degenerated into ignorance and barbarity in future days. Vegetius complains of the little cultivation of the art in his time in proportion to its merits and importance, which he says has always been held second in importance to human medicine.

The art seems to have gained little in addition for several centuries subsequent to this, though some writings on the subject appeared, of which we have only extracts handed down to us. For these we are indebted to one of the Constantines (10th century), who commanded that all the writings on this important subject that had appeared should be collated and

the substance of them formed into one work for the future guidance of practitioners and the preservation of ancient opinions. A copy of this compilation, as well as a copy of "Vegetius," by some means escaped the general devastation that took place. It is to these that we are indebted for our knowledge of the state of this art in ancient times.

Although the Arabians were celebrated for their attachment to their horses, and though they cherished and encouraged human medicine, we have few accounts of any attention paid to veterinary medicine. Hence, on the restoration of learning in the fifteenth century, few remains of this art were left. As few horses were kept at this period, and as iron shoes were generally worn, what little attention was paid to the diseases of horses now devolved upon the forgers of their shoes. The treatment of other animals was practiced by the goatherds, shepherds, and persons attending cows and oxen. But in the sixteenth century, when Europe became more enlightened, the necessity of a cultivation of this useful branch became evident. Francis the First, who has generally been termed the restorer of learning, ordered the collection of Constantine to be translated from the original Greek into Latin by Ruelli, a physician. It was soon rendered into Italian, German, and French, and by this means became dispersed over Europe. The works of Vegetius also became translated into several languages, and during the sixteenth century many treatises on veterinary medicine appeared in different parts of Europe. Among those to whom the science was indebted was the celebrated historian, Gesner, who compiled from Aristotle, Pliny, Oppian, Varro, Columella, Vegetius, and others an extensive history of animals. The part treating on domestic animals was enriched by some valuable remarks on their diseases. Vincent, an Italian author, published receipts for the cure of all the maladies of horses, and soon afterward the celebrated works of Ruffius appeared in Latin. In the latter half of this century appeared the natural history of ruminant animals, with a description of the phenomena of rumination, by Aemiliano, published in Venice. The celebrated Leonardo da Vinci published his anatomy both of the human body and of the horse. Because of the scarcity of these works, and his greater fame as a painter, da

\*\*An unfortunate, if unwitting, play on words, although Blaine knew of the existence of the veterinarian, Hippocrates. Actually there is some dispute as to whether Vegetius, who was a layman compiler, deserves full credit. The earlier veterinarian, Apsyrtus, is considered by most authorities to be the real father of veterinary medicine.

†Blaine apparently was not familiar with the works of Apsyrtus (330 A.D.), for this is a direct quotation from the "Hippiatrika." This lends further weight to the claim that Apsyrtus should be considered the true father of veterinary medicine. Also, Blaine is off by nearly two centuries in dating Vegetius, who actually lived in the latter half of the fifth century.

Vinci has received little notice in the histories of medicine.

During the seventeenth century, numerous veterinary publications appeared in every country. Fiarchi wrote an Italian treatise on horsemanship in which he introduced a very rational method of shoeing, forbidding use of caulking as destructive to the feet. The "Anatomia del Cavallo" by Ruini was published in Venice at the beginning of the century and from it almost all the French authors have copied their plates. In Germany, Böhme's "Artzeney" (1618) was a standard for nearly a century. In 1654, the "Grand Maréchal Francois" appeared; it was a voluminous work on farriery said to be composed by several authors. In 1675, Blazius, a Dutchman, published in Amsterdam a treatise on the anatomy of the horse, with some plates that were highly spoken of. In 1664, Sollysel (France) published his observation that glanders was a transmissible disease in horses. Snape, in 1686, published his "Anatomy of an Horse," and in 1698 the veterinary art received a great addition from the elaborate work of Sollysel.

It is regrettable that Sollysel had not received a general medical education. His attention was drawn to this subject from his situation as riding master, in whose hands the treatment of disease was generally confined. The riding masters usually being men of some science, and in most instances professing a knowledge of the diseases of horses, it was thought less necessary for medical men to attend to the art. It is to this principally that we must attribute the slow improvement of the art, for men of this stamp were destitute of the proper means of forming a well-grounded practice upon a knowledge of anatomy and animal economy. While their practice would unquestionably be more judicious than that of a groom or blacksmith, they obscured the necessity of a more scientific plan. Future improvements were more retarded than would have been the case had their errors been more conspicuous; the striking barbarity of grooms and farriers provided a greater impetus for reform.

Sollysel's work was translated into every language of Europe and soon became the vade mecum of every practitioner of the time. He was the first who objected to burning for the lampas (palatitis) as dangerous and absurd. He first reprobated the

bleeding in the palate in fever as useless, and pregnant with mischief from the liability of wounding the palatine artery. He taught the impropriety of introducing feathers with stimulating substances into the nose, as the inflammation occasioned might produce ulceration and glanders. He likewise pointed out the danger and folly of tying down the testicles when they were drawn toward the abdomen by pain and irritation, but directed that means should be used to lessen the irritation.

Perhaps what contributed more to the attention of veterinary arts than any other circumstance was the dreadful ravages committed in the first half of the eighteenth century by the malignant epidemic, or murrain, which visited most parts of Europe at different times. The effects of this species of plague were so dreadful that its prevention became the subject of investigation of almost every enlightened physician; and although no great advances were made in the disease itself, the science in general was benefited by the awakened attention to this subject.

About the middle of the eighteenth century, several of the continental countries opened their eyes more fully to the importance of this branch of science, and governments of these countries established, under royal patronage, public seminaries for the purpose of teaching veterinary art scientifically. One of the first, as well as the most celebrated, seminaries was established in France at Lyons in 1761, over which M. Bourgelat was placed as professor. He was director and inspector general to the veterinary schools, commissary general to the king's stables, and honorary member of the Royal Academy of Sciences. Bourgelat was a voluminous author; in 1750 he published his "Elements of Farriery," in 1765 his "Materia Medica" for the use of the veterinary pupils and, soon after that, his "Elementary Treatise on the Anatomy of the Horse," the most complete work of its kind.

In 1766, at Alfort, a second school was opened. About this time, the king of Sweden granted some honorable privileges to those who professed this branch of science, which drew some of the best practitioners from France and other countries. In 1752, the 31-volume work of Buffon and Daubenton on natural history appeared, with many hints on the conformation of animals and on their economy and diseases.



As a French contemporary with Bourgelat, lived the elder La Fosse, a name that will ever be respected in the annals of veterinary science. La Fosse made numerous improvements and discoveries which he usually communicated as memoirs to the Royal Academy of Sciences in Paris. In 1754, he collected these into one volume which was quickly translated into other languages. The first memoir described the foot and its diseases. The second was the celebrated communication on glanders, which he showed to be a local inflammation of the pituitary membrane and recommended the use of the trepan which was not new, having been practiced in England before. The third memoir described the use of the lycoperdon, or puffball, in hemorrhages. The fourth contained improvements in shoeing, and the fifth exposed the error of attributing an epidemic then prevalent to the bite of the shrew mouse, which was the generally accepted cause. Most of these memoirs were translated into English by Bartlet, a surgeon whose veterinary fame is chiefly that of a translator and compiler. Other notable contributors to veterinary medicine who were earlier trained as physicians and surgeons were: Gibson, Bracken, Osmer, Moorcroft, and Coleman.

In 1766, the younger La Fosse, who like his father, was farrier to the lesser stables of the king, presented his "Guide du Maréchal," a work on farriery. The anatomical part was concise and accompanied with some good plates. The medical part was such as to give the whole the appearance of a textbook. In 1722, he published his "Cours d'Hippiatrique," in four volumes, which may be justly esteemed the best practical system of farriery that had ever appeared.

*The Status of the British Veterinary Art in 1800.*—The principal hindrance to the advancement of this healing art has been its total confinement in the hands of persons proverbially ignorant. Custom reconciles the grossest absurdities: though the value of the horse is a theme that has exercised the pen of thousands, the knowledge of the means of preserving it in health and of curing its diseases has too often been regarded as a subject beneath the dignity of a man of education, and the practice as derogatory to the character of a gentleman. Practically every improvement made has crept into notice by stealth, usually by the exertions of some physician

or surgeon. It was to be expected that with the establishment of the Veterinary College (London, 1791) the profession would no longer be incompatible with the pretensions of the scholar.

Although the translation of Vegetius was well known in the seventeenth and eighteenth centuries, the practice of farriers remained grossly barbarous. In founder, the veins of the legs were tied to prevent the upward spread of inflammation. In affections of the head, the nuchal ligament was bored through with a hot iron—with poll evil as a frequent consequence. The resulting poll evil was treated with urine in which a hot iron had been quenched. A horse that coughed was supposed to have swallowed feathers, and was treated as skillfully as such an ingenious supposition would dictate. A stumbling horse had its nose slit. For glanders or farcy, quicksilver was sewed up in one ear, and a drench of several drugs in urine administered.

The practice of graziers and herdsmen was even more barbarous than that of the farriers. Lord Pembroke was led to say, "Whoever lets his farrier, groom, or coachman ever mention more than water gruel, a clyster, or a little bleeding, may be certain to find himself shortly on foot."

It was further stated: Farriers should not conclude that those who wish to teach reformed practices are at war with their persons, nor is there any wish to lessen their employment. Farriery is a branch of veterinary medicine; "veterinarian" is a definite appellation to which the farrier has equal right if he professes and understands the diseases of animals. The different ranks these two classes appear to bear arises from the different modes they have taken to arrive at the same point and the different degrees of progress they may have made in the pursuit of their professions.

English farriery is in a wretched state; its reform can be brought about only by application of the fundamentals of the art. For the farrier who can not gain the advantages of regular instruction, let him begin by first reading some general description of the body, paying particular attention to the structure and uses of the parts. This enlarges the mind and prepares it to receive the benefits of dissection. Any small animal may be dissected first to enable the learner to use his instruments properly. He may then proceed to dissect the horse with some text to assist him to make out the parts. When well acquainted with the appearances of the animal in health, he should take every opportunity to examine diseased animals—which are seldom wanting at the tanyard or kennel. He should now make himself intimately

acquainted with physiology and pathology; this should be succeeded by a knowledge of chemistry and materia medica. Nothing will now be wanting but experience and practice to perfect him.

*The Establishment of the Veterinary College of London.*—The period from which the principal improvements in the veterinary art in England must be dated begins with the establishment of the Veterinary College of London in 1791. In 1788, St. Bel, who was professor of anatomy in the Veterinary College at Montpellier in France, came to Britain and published proposals for instituting a veterinary school, but without success. His second visit in 1790 was more successful, for the agricultural society of Odiham in Hampshire appointed a committee to consult with him on the means of putting into effect a plan that might establish farriery upon a scientific and rational basis. The result was a proposal to form an institution called "The Veterinary College of London" and to appoint St. Bel to the professorship. The first president was the Duke of Northumberland; the vice presidents, of whom there were eight, were all noblemen except for the eminent physician, John Hunter. Veterinarians should ever remember Hunter, a spirited promoter of every branch of the healing art, for his zealous promotion of this establishment. The board of directors included a number of noblemen, eminent gentlemen, four doctors, and two clergymen. This author (Blaine) was employed as translator, anatomical demonstrator, and assistant to St. Bel.

Soon after its establishment, a house was taken where pupils were boarded, but St. Bel did not at first put into effect any active or regular system of instruction. He was an ingenious man and was indefatigable in promoting the interests of the college, but not even his strongest supporters believed him to be fitted for his position. The college was conducted by persons totally opposite in their character and habits, and from the outset was embarrassed by the improper management of funds. St. Bel himself died destitute in 1793 and was buried at the expense of the veterinary college.

Following the death of St. Bel, the professorship was to have been filled jointly by an eminent veterinarian, Moorcroft, and a surgeon and physiologist named Coleman. Upon finding teaching considerably less profitable than practice, Moorcroft

quit the school, leaving Coleman in charge. In addition to the professorship, Coleman was veterinary surgeon general and also had an extensive private practice. He was criticized for failing to attend properly to the affairs of the college, and it was said that he had an income adequate for three men. An amphitheater, museum, dissecting rooms, and a forge and stable for 50 horses were constructed. A committee of nine physicians and other medical men\* was appointed to examine students and grant certificates to those who qualified. Upon payment of an annual subscription of 2 guineas plus keep, anyone had the privilege of sending 2 horses to the college for medical assistance. A subscriber of 20 guineas had this privilege made perpetual.

Pupils were admitted to the college and received all the benefits of the institution for 20 guineas. These included the lectures of the professor on the anatomy of the horse, and the theory and practice of the veterinary art in all its branches.\*\* They saw the practice of the college upon the subscriber's horses, and had the assistance of the professor or his assistant in their dissections. Besides this, they had a most eminent advantage from the liberality of the distinguished individuals who composed the medical committee in being able to attend their lectures gratis.

For several years, parliament annually voted a sum for the support of the institution,<sup>†</sup> and graduates of the school were granted the rank of commissioned officers in His Majesty's cavalry regiments. Moreover, it was not long before most of the larger towns experienced the benefit of having a graduate of the college settled in them.

\*Under Coleman's influence, veterinarians were excluded from the committee for more than 40 years.

\*\*Until 1812, only the horse received attention, and then only under duress did the college accede to the demands of the veterinary profession for broader training.

†But for many years the college was conducted as a private enterprise.

*Ornithosis from Ducks.*—Since 1949, 87 cases of psittacosis (ornithosis) have occurred in poultry farm personnel in Czechoslovakia. The virus was isolated from sputum of the patients. They responded to chlortetracycline (aureomycin®) and chloramphenicol therapy. Neither signs nor lesions were found in the ducks.—*Vet. Bull., Nov., 1955.*

**Pulmonary Lobectomy for a Malignant Mixed Cell Tumor  
with Hypertrophic Osteoarthropathy in a Dog**

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HYPERTROPHIC osteoarthropathy is a non-contagious disease characterized by proliferation of the periosteum of long bones of the limbs and, with rare exception, is secondary to lesions of the lungs. Mather and Low,<sup>1</sup> in a review of the literature, found primary tumors and tuberculosis to be the most common lung lesions associated with this disease in the dog. Leighton and Stoyak<sup>2</sup> have pointed out that metastatic tumors of the lungs can also be a cause.

An important point in the literature on this condition in man is that regression of the body proliferation occurs following removal of the lung lesion and, conversely, remission of the osseous changes will follow return of the lesion.<sup>3,4</sup> For this reason, the possibility of performing a pulmonary lobectomy should be considered in canine patients with hypertrophic osteoarthropathy. A search of the available literature did not reveal an instance in which this had been undertaken in the dog.

**CASE REPORT**

The patient, an 8-year-old female mongrel weighing 10 lb., had first been treated on Aug. 7, 1954. She had exhibited a harsh cough, a temperature of 104 F., and her legs appeared slightly swollen. Symptomatic treatment produced temporary improvement followed by remission.

On October 17, when brought to the small animal clinic at Colorado A. & M. College, the bitch was in fair condition but with all the limbs enlarged (fig. 1). She was reluctant to stand, walked stiffly, showed pain when handled, had a mucopurulent exudate at the external nares, and still exhibited a persistent, dry, harsh cough.

Radiographs of the chest and limbs confirmed a tentative diagnosis of hypertrophic pulmonary osteoarthropathy. A homogeneous circumscribed dense area, visible



Fig. 1—The patient showing bilateral enlargement of the forelegs.

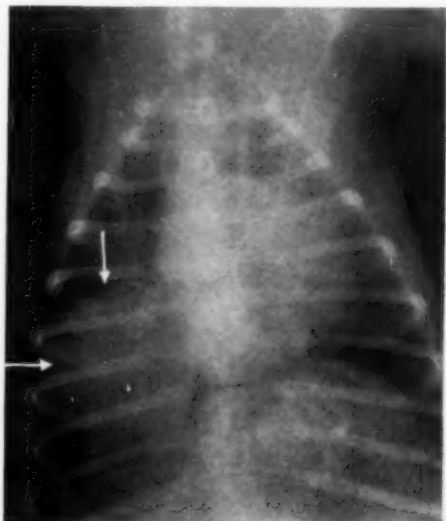


Fig. 2—Dorsoventral radiograph of the chest of the dog showing the tumor (arrows) displacing the heart and diaphragm.

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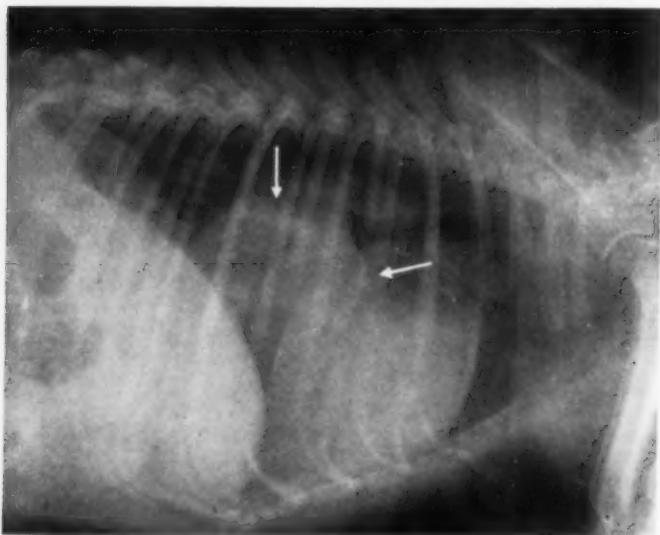


Fig. 3—Lateral radiograph of the dog's chest. The tumor (arrows) is postero-dorsal to the heart.

in the left diaphragmatic lobe of the lung, displaced the heart to the right and the diaphragm posteriorly (fig. 2, 3). The bones of the limbs and pelvis showed extensive periosteal hyperplasia (fig. 4, 5).

On October 26, a pulmonary lobectomy was performed using surital-ether anes-

thesia. A subperiosteal resection of the left sixth rib combined with transection of the seventh rib gave access to the thoracic cavity. The neoplasm involved almost the entire diaphragmatic lobe of the left lung. Adhesions were present between the neoplastic tissue and the posterior border of the cardiac lobe of the lung. Two pairs of Kelly forceps were placed parallel to each other across the cardiac lobe, approximately  $\frac{1}{2}$  inch from its point of attachment to the neoplasm, and the tissue between the forceps was severed. The cut edge of the cardiac lobe was closed by placing two rows of continuous through-and-through sutures proximal to the attached forceps. During this procedure, a small penetrating wound was accidentally made in the neoplasm. It bled profusely until stopped with a small piece of saline-soaked gelfoam. The neoplasm was also found to be adherent to the left phrenic nerve which, with accompanying vessels that had to be ligated, was severed anterior and posterior to the site of involvement. Adhesions to the mediastinum were severed by blunt and sharp dissection.

The major vessels at the base of the diaphragmatic lobe were isolated, doubly ligated, and severed. A Satinsky clamp was placed across the bronchus at a right angle to its axis just distal to the proposed point of transection. Using an attached atrau-



Fig. 4—Periosteal hyperplasia of the bones of the forelegs of the dog.

matic needle, No. 000 catgut suture was inserted through both walls of the bronchus which was partially severed, proximal to the clamp, before the sutures were drawn tight and tied over the severed end. This suturing was repeated three times to insure a complete closure of the bronchial stump. The neoplastic diaphragmatic lobe was then removed and the thoracotomy incision routinely closed.

During the operation, a total of 100 cc. of 5 per cent dextrose and 200 cc. of whole blood were administered intravenously. A mixture of penicillin and streptomycin was given postoperatively. The patient made a slow but satisfactory recovery from anesthesia.

The neoplasm measured 6 by 5 by 4 cm. and with the remaining tissue of the lung lobe weighed 63 Gm. (fig. 6). Histopathological examination revealed a mixed cell neoplasm which contained epithelial and osteogenic tissue. The epithelium originated from the bronchus and had undergone metaplasia to a stratified squamous form. The osteogenic tissue was abundant

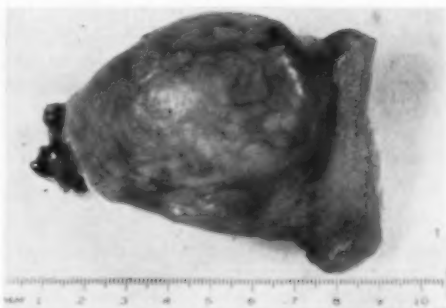


Fig. 6—Mixed cell tumor from the left diaphragmatic lobe of the lung.

and was forming osteoid tissue in some areas. Both epithelial and osteogenic cells showed evidence of malignancy.

During the first few postoperative days, the patient continued to cough, exhibited some dyspnea, and seemed stiff and sore. Penicillin-streptomycin therapy was continued and subcutaneous injections of glucose and B-complex vitamins were given. By the fifth postoperative day, the dog appeared more alert, showed less pain, and seemed to have less enlargement of the legs. Her appetite improved and she appeared to be recovering. On November 10, radiographs of the long bones of the limbs showed no detectable reduction in the periosteal proliferations.

The patient appeared bright and alert until about November 15, at which time she evidenced considerable pain when handled. Her condition deteriorated steadily despite injections of ACTH, diathermy, and other symptomatic treatment. By December 15 her pain was acute, she cried almost con-



Fig. 5—Periosteal hyperplasia of the pelvis (arrows), femurs, tibiae, and fibulae of the dog.



Fig. 7—Multiple metastases in the dog's liver and spleen (arrows).



stantly, and resisted any attempts to be moved so euthanasia was performed.

On necropsy, metastatic foci from the tumor were found scattered throughout the body (fig. 7). There was evidence of direct extension of the neoplasm onto the diaphragm and parietal and visceral pleura.

#### DISCUSSION

The results obtained in this case were questionable. Although the dog showed temporary improvement clinically, regression of the bone lesions could not be demonstrated radiographically. Obviously, early diagnosis is essential in these cases if surgical therapy is to be effective. As routine radiographic examination of the canine chest becomes more common, the chances of successful treatment of this condition will be enhanced. There is reason to believe that cases of primary lung cancer with hypertrophic pulmonary osteoarthropathy in dogs may be treated successfully.

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#### Liver Fat and Fetal Weight in Ewes

When ewes were well fed the first 100 days of pregnancy, then part of them fed a low-plane diet, there was a positive correlation between fat in their livers and the weight of their fetuses when they were slaughtered at the end of pregnancy. This was not found in the ewes which were continued on the high-plane diet.—*Vet. Bull.*, Oct., 1955, 569.

**Intra-Abdominal Fertilization.**—A heifer was impregnated when semen was deposited in the abdominal cavity close to the left ovary, by means of a cannula passed through the wall of the vagina at the fornix.—*Vet. Bull.*, Aug., 1955.

**Brucella Abortus Infection in a Dog.**—A bitch, 56 days pregnant, aborted 3 fetuses after consuming infected portions of an aborted calf. She developed a positive titer to *Br. abortus* which lasted nine months, but gave birth to 4 normal puppies at her next pregnancy.—*Vet. Bull.*, Nov., 1955.

#### Hypocalcemia in Breeding Ewes

In differentiating hypocalcemia from pregnancy toxemia in ewes, the sudden occurrence of hypocalcemia as the result of an abrupt change in ration is in contrast to the gradual development of pregnancy toxemia on a gradually declining plane of nutrition. Ewes with hypocalcemia become paralyzed and die within 24 hours; those with pregnancy toxemia become blind, dull, and usually live for several days.—*Vet. Bull.*, Nov., 1955.

#### Factors Affecting Ovulation in Cows

When injected into 14 young dairy cows at the beginning of estrus, epinephrine did not significantly hasten ovulation, atropine blocked ovulation in 69 per cent, and ovulation remained blocked in several cows even when progesterone was added to the atropine injection.—*J. Anim. Sci.*, Aug., 1955.

#### Advantages of Cross-Bred Hogs

Cross breeding of swine for commercial production is almost as universal as the use of hybrid seed corn. At the University of Minnesota, data based on the number of pigs raised per litter, growth rate, and feed per 100 lb. of gain, indicated an over all advantage of 6.3 per cent for the first cross and 11.7 per cent when the three new Minnesota breeds were successively crossed.—*Successful Farming*, Jan., 1956.

[Dr. L. M. Winters, Ph.D., author of the above article, is also the author of an excellent text "Animal Breeding," the fifth edition of which was published in 1954 by John Wiley & Sons, Inc. It is recommended reading for anyone interested in the subject.—W.A.A.]

Dog teams may be dropped at the South Pole by parachute if men whom the United States Antarctic exposition hopes to land there can not be taken out otherwise.—*Sci. Newsletter*, Dec., 1955.



### Atrophic Rhinitis. VI. The Establishment of an Atrophic Rhinitis-Free Herd of Hogs

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FOLLOWING the discovery of atrophic rhinitis in the swine-breeding herd of the Agricultural Research Center, Beltsville, Md., in the spring of 1952, the problem of finding a method of acquiring and maintaining seven inbred strains free of this disease was presented. It was approached in two ways: (1) by selection with the rhinoscope at weaning time of rhinitis-negative litters which were farrowed by sows having the most favorable history in relation to the disease, and (2) by removing pigs in an aseptic manner from the sow at birth and hand-raising them in isolation. This report covers only the second approach to the problem.

The plan of removing pigs from the sow at birth was suggested by the work of Young and Underdahl,<sup>1</sup> who successfully raised baby pigs in isolation after their removal from the sow in individual sterilized cloth bags. Johnson *et al.*<sup>2</sup> have recently reported on the raising of atrophic rhinitis-free pigs which also involved the removal of baby pigs from the sow at birth.

The following program, with some variation, was carried out during the spring and fall of 1953 and again during the spring farrowing season of 1954.

#### METHODS

Baby pigs from selected inbred strains were obtained from sows handled in the usual manner. The sows were washed with water and placed in

Drs. Shuman and Earl are from the Animal Disease and Parasite Research Branch, and Mr. Stevenson is from the Animal and Poultry Husbandry Research Branch, Agricultural Research Service, Beltsville, Md.

Examinations for protozoan and helminth infection were made by Drs. John S. Andrews and Lloyd A. Spindler, Animal Disease and Parasite Research Branch, Agricultural Research Service, Beltsville, Md.

The authors express their appreciation to Drs. H. W. Johnson and L. O. Mott of the Animal Disease and Parasite Research Branch, Dr. T. C. Byerly and Messrs. N. R. Ellis and W. J. Krebs of the Animal and Poultry Husbandry Research Branch, Agricultural Research Center, Beltsville, Md., for their helpful suggestions in planning the facilities for isolation and propagation of the rhinitis free herd. Appreciation is also expressed to Drs. I. P. Earle, biochemist, G. E. Whitmore, veterinarian, and to Messrs. R. J. Davey and J. X. King, animal husbandmen, Animal and Poultry Husbandry Research Branch, Beltsville, Md., for their valuable advice and assistance in the initial stage of raising the baby pigs.

farrowing pens which, in most instances, had been cleaned and disinfected. No special cleansing of the genital region was done at farrowing. The sows were examined rhinoscopically before leaving the farrowing barn. The pigs which were to be hand-raised were caught at birth on sterile cloths which were also used to wipe away the fetal membranes and partially dry the pigs. They were then placed in a sterilized metal bushel basket, over which a brooder lamp was suspended, and kept there until the desired number had been obtained; usually one to three hours. At the beginning of the program, 2 females and 1 male were selected from each litter but, due to early death losses, this number was later doubled to get adequate breed representation. After the last pig had been caught, they were taken to brooder units in a separate building which had been used to house small laboratory animals. The ears of the pigs were notched for identification; their canine teeth clipped; navel cords tied, cut short, and disinfected with iodine; and their birth weights recorded. In a few cases of prolonged labor, these details were taken care of at the farrowing barn.

At 3 weeks of age, or somewhat later if not adjusted to pelleted feed, they were transferred to the Animal Disease Station and placed in outside isolation pens. These pens offered good protection against the elements and had concrete floors raised 2 or 3 ft. off the ground. When the pigs were 56 days old, they were weighed, rhinoscopically examined, and transferred to restricted pasture lots, the males and females being separated at this time. These particular lots had been used by sheep and horses, but there was no history of hogs having been in them. When sexually mature, the pigs were again examined rhinoscopically and transferred to a remote isolation area. This area, with the exception of a substantial cattle shed, was built for the express purpose of maintenance and propagation of these hogs (fig. 1 and 2). Although beef cattle had been pastured here, there was no history of hogs having been in this area.

The available litter mates of the hand-raised pigs, which had been left with the sows and raised under natural conditions, were rhinoscopically examined at 4 to 6 months of age.

The offspring of the hand-raised swine were also examined rhinoscopically, and any that died or were killed after 3 weeks of age were examined, on postmortem for evidence of atrophic rhinitis. Animals that were either sold or transferred to federal institutions for breeding purposes, and those that were used locally were examined rhinoscopically before release.



Fig. 1—Isolation area consisting of 24 farrowing pens, each separated by a distance of 24 ft., and a shed plus lots for holding the sows and boars. The area was graded to prevent water run-off passing from one pen to another.

Every effort was made to handle the pigs in a sanitary manner throughout the operation. However, it was necessary for the individuals who caught the baby pigs to also take care of the nursery quarters. When engaged in obtaining the baby pigs, they wore freshly laundered coveralls and either rubber boots or overshoes. Foot troughs containing 2 per cent lye solution were provided at the entrances of the farrowing barn. Protective clothing was removed when leaving this barn and kept there until needed again. When feeding and caring for the baby pigs, the attendants wore clean surgical gowns. The two rooms in which the pigs were first kept were thoroughly cleaned and disinfected with a commercial quaternary ammonium compound. The cages, metal troughs, and other equipment were also thoroughly cleaned and placed in a tank containing a solution of 2-oxydiphenyl sodium. This process was repeated each time a room was vacated in preparation for another group of pigs. When the pigs were 2 weeks of age, they were transferred to a third

room, and here only the equipment was routinely cleaned and disinfected. In the isolation pens at the Animal Disease Station, attendants were able to take care of the pigs without entering the pens. Of necessity, their other work brought them in contact with normal horses, calves, and swine.

All animal transfers were made in a truck that had been thoroughly cleaned and disinfected with a 2 per cent lye solution. Personnel from the Animal Disease Station took care of the animals in the first (restricted pasture lots) and second (final) isolation areas. Feed delivered to these areas came in previously-cleaned and steam-sterilized bags. A memorandum of instructions was given to all individuals even remotely concerned in this operation to insure that the prescribed sanitary practices, including the quarantining of these areas, would be complied with. Infractions did occur but, fortunately, with no apparent harm being done. Despite precautions, it was recognized that wildlife, particularly birds, presented a potential disease-transfer hazard that could not be eliminated.



Fig. 2—Isolation pens, each of which is 26 ft. wide and 110 ft. deep and provided with a farrowing house, automatic feeder, waterer, sun shelter, trash can, boot scrub brush, and bucket containing a disinfectant.

The basal milk diet fed to the baby pigs was either a commercial sow's milk substitute or pasteurized goat's milk. Baby pigs were bottle-fed at two- to four-hour intervals for the first three to five days, depending upon their apparent vigor and health, after which time they were fed in troughs. In some cases where the pigs were weakened by diarrhea or lack of appetite, the bottle-feeding period was prolonged to a week or ten days. Milk feeding was discontinued at 21 to 23 days of age. Pelleted pig starter and water were made available ad lib. about the seventh day and were continued until the fifty-sixth day. A growing ration was then provided.

With few exceptions the baby pigs received, within six hours after birth, 100 to 150 ml. of sow colostrum, plus an oral dosage of 25,000 units of vitamin A and 1 mg. of vitamin K. Colostrum was obtained by hand milking sows immediately preceding or during farrowing. While some sows were too nervous and irritable to permit milking, most of them made little effort to restrain milk flow at this time. The udder was first washed with a solution containing a commercial quaternary ammonium compound and dried, in an effort to provide as aseptic condition as possible. Various treatments were assigned to the different pigs in an effort to supplement the effect of colostrum. These included combinations of injections of porcine *gamma* globulin, anti-hog cholera serum, and normal homologous swine serum. Normal swine serum was also administered orally to some of the pigs.

During the first two farrowing seasons, the baby pigs were started in the brooders in lots of 3 to 6 pigs. However, since their tendency to suck each other's ears, tails, and navels appeared to be a contributing factor to digestive upsets, they were started in individual cages throughout the last season.

Initially, either the brooder cage or the room temperature was kept at 85 to 90 F. for the first day. This was followed by a reduction of four to five degrees each day until it reached 65 to 70 F. Environmental temperatures were kept at this range until the pigs were 2 weeks old. At this time, the pigs were moved to a room where the temperature was gradually reduced to prepare them for outside conditions.

Nasal washings were examined directly for trichomonads by means of the microscope when the hand-raised pigs were 56 days old and again when they reached sexual maturity. The nasal washings of 60 pigs, representing the group farrowed by the hand-raised pigs, were also examined in the same manner. Fecal specimens of 11 of these pigs selected at random were examined directly for protozoan cysts and worm eggs by means of the microscope and for trichomonads by culturing in a suitable medium.

#### RESULTS

A total of 220 baby pigs were obtained

from 59 sows. The rhinoscopic examination of these sows resulted in the following diagnoses: 46 negative, 10 positive, 2 questionable, and 1 missed. Of the 220 pigs, 106 died before 3 weeks of age and were not examined for atrophic rhinitis. The remaining 114 pigs were delivered to the Animal Disease Station, and 7 of these died before reaching 56 days of age. Of the 7, 5 were negative for atrophic rhinitis on postmortem examination, and 2 were overlooked. The remaining 107 pigs were examined rhinoscopically at 56 days of age and were diagnosed as negative. Of the 89 raised to sexual maturity, 87 were diagnosed as negative when examined with the rhinoscope. The other 2 were questionable but were found to be negative upon postmortem examination. All 18 that either died or were killed for obvious physical defects before reaching this age were negative on postmortem examination. Twenty-two either died or were killed after reaching sexual maturity, and on postmortem examination 21 were negative and 1 was positive. This positive hog, however, could no longer be considered as part of the "rhinitis-free herd," because at 8 months of age, and four months prior to the date of postmortem examination, it had been transferred to a known diseased area. A rhinoscopic examination on this animal two months prior to removal from the isolation area had been negative. One gilt of the hand-raised group presented the only oddity of the snout, and it was quite disconcerting when first noticed. At 9 months of age, a slight but definite deviation of the snout to the left could be seen on close observation. This animal was taken to the abattoir on the following day and on postmortem examination presented a nasal septum that was semilunar in shape, flattening of the right ventral turbinate, and complete compensatory hypertrophy of the left ventral turbinate. A negative diagnosis was made for the following reasons: (1) the physical appearance of the turbinates, as to thickness of the mucous membrane and bony structure, were normal; and (2) there was no evidence of shrinkage of the turbinates as judged by the size of the meatuses.

During the spring and fall of 1954, there were 158 pigs, exclusive of those that died at birth or shortly after, representing the offspring of the hand-raised pigs of 1953.

When examined rhinoscopically at 3 to 5 months of age for atrophic rhinitis, 139 were diagnosed as negative, 1 positive, and 1 questionable. The positive and questionable pigs were immediately sent to the abattoir and on postmortem were found to be negative. Of 8 which died or were killed before being examined with the rhinoscope, 5 on postmortem examination were found to be negative, and 3 were overlooked. The remaining 9 were sold as suckling pigs with their dams and were not examined. Rhinoscopic examination of the 2 dams during the gestation period, however, showed them to be negative. Following rhinoscopic examination of 143 litter mates of the hand-raised pigs, 76 were diagnosed as negative, 59 positive, and 8 questionable.

No trichomonads were found in the nasal washings of hand-raised pigs. However, nasal washings of 1 pig in the group representing part of those farrowed by the hand-raised pigs did show trichomonads, and fecal specimens of about 73 per cent of these pigs contained trichomonads; also, 45 per cent of the pigs were infected with the large roundworm, 19 per cent with *Endamoeba* sp., and 9 per cent with an unidentified nematode.

#### DISCUSSION

Actually, the livability of the hand-raised baby pigs appeared to be more dependent upon the maintenance of sanitation than upon the superiority of either a particular prophylactic treatment or feeding formula. Directly associated with sanitation was the necessity for an adequate amount of help. As the number of animals increased, the work load of feeding, cleaning, and disinfecting the facilities also increased. Under these conditions, some prescribed rules of sanitation were not rigidly carried out. Frequently such relaxation of procedures was followed by the sudden appearance of a wave of acute diarrhea, which accounted for the high mortality of the baby pigs. One incident, although possibly coincidental, does illustrate how precarious the position is in raising them. A sow died in the atrophic rhinitis-free herd, leaving 3 apparently normal, hungry 2-day-old pigs. In the interest of economy, these 3 pigs were placed in a pen in one of the brooder rooms which contained 10 pigs, 6 to 8 days old. At this time, the 10 pigs were doing well and exhibited no diarrhea. Within 16

hours, 1 of the 10 pigs became listless, developed diarrhea, and died eight hours after the first symptoms were noticed. Despite treatment which may have prolonged their lives, the remaining 9 pigs died from the third to fifteenth day after introduction of the orphaned pigs. The orphaned pigs also died from the third to the fifteenth day after arrival in the brooder room.

It is believed that the 1 pig found positive four months after being transferred to an area where atrophic rhinitis was known to exist, demonstrates that a mature, susceptible animal can become affected with this disease.

The results of the parasitic examinations are of interest, since they show that trichomonads were present in the nose and digestive tract as were other Protozoa and nematodes in the offspring of the hand-raised pigs.

#### SUMMARY

The establishment of an atrophic rhinitis-free herd of hogs at the Agricultural Research Center, Beltsville, Md., is reported. The method employed consisted of removing the baby pigs from the sow at birth, using sanitary precautions, and hand-raising them in isolation.

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*Feeding Wood Sugar Acids for Ketosis.*—A complex mixture of sodium and calcium salt of lignosulfonic and wood sugar acids fed during the winter of 1954-1955, at a level of 2 to 4 per cent of the ration to 2,144 producing cows in 83 herds in Marathon County, Wis., apparently reduced ketosis cases by 84 per cent.—*Marathon Corp. News Release, Oct. 18, 1955.*

*Keratin Products in Poultry Rations.*—Keratin products, from beef hoofs, hog hoofs, and hog hair, in a chick starter ration were, contrary to previous reports, apparently not utilized for growth whether used alone or in combination with soybean or blood meals.—*The Feed Bag, Dec., 1955, from Poult. Sci., July, 1955.*

## Treatment of Ringworm in Chinchillas

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THE RELATIVE neglect of medical mycology in both human and veterinary medicine has been emphasized in recent literature.<sup>1,2</sup> In view of the past apathy of the veterinary profession toward mycotic diseases, the increasing awareness of the potentialities and seriousness of this group of organisms is encouraging.<sup>3-11</sup>

The following report does not include diagnostic techniques; however, the importance of a positive diagnosis should be mentioned. The ability of the pathogenic fungi to simulate the clinical and pathological signs of other systemic diseases makes the actual demonstration of the parasite a prerequisite to diagnosis. "Symptomatology and pathology alone can not be relied upon as sufficient bases for determining a fungus disease."<sup>12</sup> The same is true of superficial mycotic infections.<sup>8,11</sup>

Descriptions of methods used in the diagnosis of ringworm have recently appeared in the veterinary literature.<sup>8, 10, 12</sup> If the practicing veterinarian wishes further confirmation, the assistance of a number of laboratories is available.<sup>11</sup> A maximum of cooperation should exist between the medical mycologist and those concerned with animal diseases.<sup>1, 2, 8, 10, 12-16</sup>

In the etiology of dermatomycosis or ringworm involving domestic animals, a number of species of fungi have been incriminated. Most of the commonly occurring organisms are limited to two genera, *Trichophyton* and *Microsporum*. This paper, however, will deal only with *Trichophyton* in a single host, the chinchilla.

Ringworm has been reported from several rodents<sup>17,18</sup> and a number of furbearing animals.<sup>20-21</sup> The pampered chinchilla is no exception,<sup>8, 12, 20-22</sup> the industry having suffered heavy losses from this parasite. Control has been extremely difficult, involving a never-ending course of individual treatment by way of hand application. The toxicity of one drug has been reported<sup>20-22</sup> and observed to occur in chinchillas; also, the subsequent spread

From the Department of Pathology and Parasitology, School of Veterinary Medicine, University of Georgia, Athens. Presented in part at the forty-ninth annual convention of the Georgia State Veterinary Medical Association, Atlanta, May 29-31, 1955.

For professional assistance in this investigation, gratitude is expressed to Dr. Lucille K. Georg, Department of Mycology, Communicable Disease Center, Public Health Service, U. S. Department of Health, Education, and Welfare, Chamblee, Ga.

The facilities and research animals necessary, as well as the photographs, were supplied by Jessica Evergreen Chinchilla Ranch, Columbus, Ga.

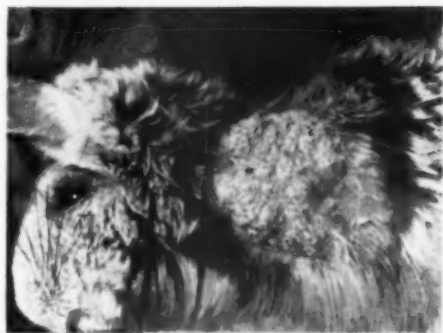


Fig. 1—Advanced ringworm in a chinchilla prior to treatment.

of other infections due to the continuous handling of animals must be considered. It has been clearly demonstrated that improper treatment of superficial mycological infections may cause more disability than the disease itself. A better means of therapy and control, and the avoidance of handling animals has become necessary.

### CLINICAL SIGNS

Ringworm seems to be more easily recognized in chinchillas than in other animals, since chinchillas apparently do not have the many types of dermatosis which so frequently complicate a diagnosis. The usual pattern of clinical signs includes, at the onset, small, denuded, inflamed areas



Fig. 2—The same lesion shown in figure 1 ten days after therapy was started.





Fig. 3—The same lesion shown in figures 1 and 2 20 days after therapy was started.

around the nose or forefeet; however, lesions may appear on any part of the animal's body and, in more advanced cases, may be manifested as a single circumscribed area of intense inflammation with possible scab formation (fig. 1, 2, 3). The isolation of *Trichophyton mentagrophytes* confirms the diagnosis.<sup>11,27</sup>

Differential diagnosis is necessary with only the so-called "skin condition" of chinchillas, which has been attributed to the animal's inability to utilize pantothenic acid at the normal dietary level and is believed not to be related to an infectious agent.<sup>27,34,35</sup> The skin exhibits a dandruff-like appearance, frequently commencing around the nose or on the forefeet; however, there is a total absence of an inflammatory reaction (fig. 4) and culturing has failed to yield a fungous organism.<sup>36</sup>



Fig. 4—Lesions in a chinchilla typical of those associated with a so-called "skin condition." Note the dandruff-like appearance and absence of inflammation.

## EXPERIMENTAL FINDINGS

After *in vivo* screening of a number of compounds for possible fungicidal properties, iodochlorohydroxyquinoline (iodine 39%) was selected for extensive trial. The powdered form of this product was mixed with a regular dust bath material,\* the ratio being established at 50 Gm. of the active ingredient to 500 Gm. of fuller's earth.† Toxicity studies were made with 15 experimental animals and when no ill effects appeared after 21 days of continuous availability of the medicated bath, the proposed plan was considered safe for clinical trials. Treatment of 12 infected chinchillas further confirmed its safety and efficiency; animals treated on alternate days for five treatments completely recovered.

The use of various concentrations of iodochlorohydroxyquinoline in the medicated dust bath, in 55 successfully treated animals, indicated that the original formula (1:10) was a desirable concentration.\*\* When the patients had access to the medicated bath for one hour on alternate days for five treatments, a single bath prepared as described would treat a minimum of 10 infected animals.

## CLINICAL RESULTS

More than 1,500 affected chinchillas have been treated in the prescribed manner, with approximately 5 per cent recurrences. A majority of the failures apparently were due to the continued use of a single medicated dust bath after it had lost the necessary concentration of the active ingredient.

The only disadvantage to the described therapy was a temporary staining of the coat. This stain, however, disappeared before the fur had grown in sufficiently for pelting.

It is of interest that the topical application of vioform‡ (iodochlorohydroxyquinoline) has shown considerable promise in treating ringworm of other domestic animals, 11 cattle and 5 dogs with ringworm having been successfully treated by the topical application of the powder. Additional studies on the fungicidal properties of this product are in progress.

## SUMMARY

The clinical manifestations of ringworm in chinchillas, and the necessary differential diagnosis, have been described. As a successful and economical treatment of the

\*As routine practice for cleansing purposes, a dust bath is supplied chinchillas. Under normal circumstances, a bathing interval three to five days is recommended.<sup>36</sup>

†Material commonly used as a dust bath.

\*\*Dermabath, a similar formulation, is available from Jessca Evergreen Chinchilla Ranch, Columbus, Ga.

‡Ciba Pharmaceutical Products, Summit, N. J.



condition, a relatively old drug (iodochlorohydroxyquinoline) has been employed. One typical case is shown.

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### Tumor of Canine Pituitary Gland

An adenoma, composed chiefly of chromophobic cells but containing groups of acidophilic and basophilic cells, was found in the pituitary gland of an old mongrel bitch. Since the normal anterior pituitary gland was not found, it was believed that the absence of endocrine disturbance was due to compensating hormones produced by the tumor.—*Vet. Bull., Nov., 1955.*

### Control of Pullorum Disease

*In vitro* tests showed *Salmonella pullorum* to be sensitive to low concentrations of aureomycin® and chloramphenicol and to moderately low concentrations of penicillin. Proper concentrations of cobalt greatly increased the antibacterial action of penicillin both *in vitro* and *in vivo*. The first two antibiotics reduced the mortality in artificially infected chicks, while only relatively high levels of penicillin were effective.—*Vet. Bull., Nov., 1955.*

*Tuberculosis in Cattle in Germany.*—In Germany, 30 to 50 per cent of all cattle and 60 to 70 per cent of all older cows are affected with tuberculosis.—*Vet. Bull., Nov., 1955.*

## Diagnosis of Disseminated Canine Coccidioidomycosis

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COCCIDIOIDOMYCOSIS of the dog has been the subject of scattered reports. Farness<sup>3</sup> was first to find spherules of *Coccidioides immitis* in lung, liver, spleen, and kidney tissue of a Great Dane that had been destroyed because of progressive inability to use the rear legs. Smith<sup>7</sup> found granulomatous lesions containing coccidioidal spherules in a Fox Terrier destroyed when it failed to respond to treatment for severe nephritis.

Spriegel and Milliff<sup>8</sup> diagnosed coccidioidomycosis after microscopic examination of granulomatous lesions found in the lungs of a Cocker Spaniel that had died after failing to respond to treatment. This dog had a history of steady decline for six months and exhibited emaciation, dehydration, lameness, constant shivering, and diarrhea. Though its appetite was good, the dog appeared distressed after eating. The superficial lymph nodes were slightly enlarged, the abdomen tense, and both corneas cloudy.

Jasper and Lewis,<sup>6</sup> in reporting the first confirmed canine coccidioidal infection from California, observed that no characteristic symptomatology had developed upon which to base an antemortem diagnosis of the disease in the dog. The dog they described demonstrated symptoms suggestive of diaphragmatic hernia. A marked bilateral anteroposterior convexity of the thoracic cage with dyspnea and moderate polypnea were observed, the dyspnea increasing when the hind-legs were elevated. The dog would eat only small amounts of food at a time then fall over on its side and whine until recovery. After euthanasia and necropsy, a microscopic examination of granulomatous lesions on the pleura and in the lungs, spleen, and liver revealed *Coccidioides* spherules. The authors suggested that diagnosis might be aided by culture or smear of sputum where the animal suffered a productive cough and that information gained from radiographs and the coccidioidin skin test might help.

Ville<sup>1</sup> listed emaciation, listlessness, a dry

hacking cough, fever, and dyspnea in a male Boxer, necropsy of which revealed extensive mediastinal and pulmonary involvement, as well as affection of a body lymph node, the liver, and one kidney.

Cordy and Hoop<sup>2</sup> and Hage and Moulton<sup>4</sup> described coccidioidal infections in the skeletons of 1 and 4 dogs, respectively. Enlargement of the affected bones, lameness, and pain were outstanding and the chronicity was marked. The animal observed by Cordy and Hoop retained a good appetite but had difficulty picking up food and swallowing, doubtless due to pain from a lesion in the mandible.

Two of the 4 dogs reported by Hage and Moulton exhibited intermittent fever, malaise, occasional nausea, and diarrhea, but the appetite was poor in only 1 dog. Three of these 4 dogs were tested for sensitivity to coccidioidin. Reactions were observed to develop slowly and to be manifest only to undiluted material. Serums from the 3 dogs were positive for complement-fixing antibody and 2 of the 3 for precipitins. Further application of coccidioidin-sensitivity and serological tests has been reported by Reed.<sup>5</sup>

The purpose of this paper is to report the most common symptoms and lesions found in 52 dogs known to have been infected by *C. immitis*, with the hope that a diagnostic regimen will be suggested. The study was made in cooperation with practicing veterinarians in Tucson and Phoenix, Ariz. It involved a close clinical study of tentatively diagnosed infections, coupled with evaluation of applicable laboratory diagnostic procedures. All cases that terminated fatally were subjected to complete necropsy, plus cultural and histopathological study, in order to confirm diagnosis and rule out diseases that might be confused with coccidioidomycosis, such as blastomycosis, histoplasmosis, actinomycosis, and tuberculosis.

### CHARACTERISTICS OF THE INFECTION

*Course.*—Coccidioidal infections in dogs appear to be chronic. The longest course recorded in this study covered over four years from first symptoms to requested euthanasia. One dog was destroyed within two weeks of the owner's first observation of symptoms, but this remains the exception. A two- to five-month course has been typical.

From the Department of Animal Pathology, Arizona Agricultural Experiment Station, College of Agriculture, University of Arizona, Tucson, Arizona technical paper No. 370.

This investigation was supported in part by research grant No. E-682 (C) from the National Microbiological Institute of the National Institutes of Health, U. S. Public Health Service.

The contributions to this research by Dr. C. E. Smith, dean, School of Public Health, University of California, Berkeley, are greatly appreciated. The following veterinarians cooperated in the clinical study: P. F. McQuown, A. A. Budurin, R. M. Carter, L. P. Graham, J. L. Hinds, G. S. Calderwood, F. R. Benton, and D. Durmiak.

**Mortality.**—Only 2 of the 52 dogs died from direct effects of the disease. The others were destroyed at the owner's request after treatment was obviously hopeless.

**Age and Breed Affected.**—Diagnoses were made in dogs 6 weeks to 6 years of age. When destroyed, 15 were under 1 year of age, 18 were 1 to 2 years old, and all others, except 7 for which age was not determined, were over 2 years old. Of the 52 dogs studied, 26 (50%) were Boxers.

#### SYMPTOMS

Dogs with symptoms that were eventually attributed to coccidioidomycosis exhibited a wide range of appearance when first presented to the veterinary clinician. The disease was diagnosed in dogs varying from excellent general appearance to cachectic. Among the clients' reasons for presenting their dogs were listlessness, poor appetite, intermittent diarrhea, cough, shortness of breath, loss of weight, lameness, enlarged joints, atrophy of muscle groups, and exhibition of pain in various parts of the body.

**Cough.**—Coughing almost invariably

was, or had been, noticed in these dogs. Differentiation from coughs due to more common causes being necessary, many diagnoses were based on other manifestations. Though the disease is chronic, the cough appeared as either acute or chronic, lasting a week to months.

The coughing induced by coccidioidal infection varied from harsh, reverberating, strong, and deep to soft and shallow. Paroxysms were seldom prolonged, though many dogs were exhausted by a strong cough. The coughs were typically dry and unproductive, yielding exudate from the respiratory passages in few cases. Infections were most easily diagnosed in dogs that retained a loud, vigorous cough for many weeks. Transient coughs were frequently overlooked or attributed to bronchitis or "kennel cough" and only later associated with the onset of coccidioidomycosis. It is believed that coughing manifest in this infection is induced by the granulomatous enlargement of the bronchial lymph nodes (fig. 1) which often encroach on the trachea and bronchi, giving rise to stenotic tracheal sounds. Common

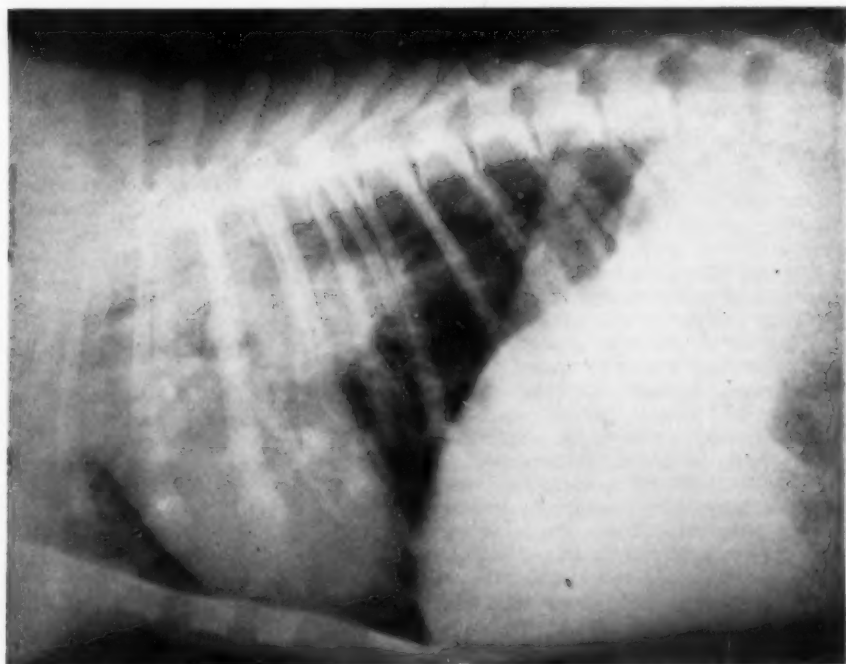


Fig. 1.—Radiograph demonstrating thoracic lesions produced by coccidioidomycosis in a dog.

association of characteristic symptoms with granulomatous processes in bronchial and mediastinal lymphoid tissue made it necessary to characterize the infection as disseminated coccidioidomycosis, as the organisms had spread beyond the lungs, the generally accepted site of primary infection.

TABLE 1—Distribution of Lesions Produced by Coccidioid Infection in Dogs

No. dogs	Breed	Tissues in which lesions occurred								
		Lung	Thoracic L. N.*	Liver	Spleen	Kidney	Heart	Bone	Eye	Subcu.†
26	Boxer	18	17	8	7	3	6	15	2	3
8	Cocker Spaniel	6	4	4	2	2	4	4	—	—
3	Collie	3	2	2	2	2	—	1	—	—
3	Terrier	3	3	3	3	1	2	—	—	—
2	Labrador	2	2	1	1	1	1	2	—	—
2	Beagle	2	2	2	1	1	—	—	—	—
2	Shepherd	2	2	1	—	2	—	—	—	—
2	Mixed	2	2	1	—	2	—	1	—	—
1	Dalmatian	1	1	—	—	—	—	1	—	1
1	Dobermann Pinscher**	—	—	—	—	—	—	—	—	—
1	Pointer	1	1	1	—	—	—	1	—	—
1	Samoyed	1	1	—	—	—	—	—	—	—
52		41	37	23	16	14	13	25	2	4

\*Thoracic lymph nodes; †subcutaneous tissues; \*\*not necropsied.

The lungs, even in severely affected, advanced cases revealed little on clinical examination without use of radiographs. Dry râles were commonly heard, and occasionally a dull area could be located by percussion, but no amphoric respiration or "cracked-pot" resonance associated with cavitation was noticed. The shortness of breath and anoxic collapse present in some severe cases were probably due to diminished tracheal lumen, to loss of functional alveoli, or to both, but many dogs with extensive lung involvement exhibited almost normal respiratory activity unless forced to indulge in strenuous exercise.

In such cases, thoracic radiographs were found to be of value. A properly exposed film would clearly reveal the abnormal processes associated with thoracic coccidioid infection, principally widening (sunburst) hilar shadows, increased density along the bronchial tree, and nodular lesions in lung parenchyma (fig. 1). This picture has come to be considered pathognomonic of the disease in dogs from the enzootic area. Encroachment on the lumen of the trachea over the base of the heart

was often observed. The heart shadow was enlarged in several dogs, denoting epicardial and myocardial involvement with pericardial effusion.

Veterinarians who have enlisted the help of specialists in radiology of man have been frustrated by the desire of such individuals to position the dog for dorsoventral or ventrodorsal exposures. The heart shadow blocks the hilar area in this position, masking the most revealing pathological changes. Only when lesions in individual lungs are sought should such position be used.

**Temperature.**—With the exception of dogs with slowly progressing bone lesions, an elevated temperature was a constant clinical finding. Active cases suffered constant, atypical fever, while dogs with bone and joint involvement sometimes developed temperature elevations only intermittently. In active, though chronic cases, rectal temperatures were as high as 106.0 F., but more commonly 104.8 to 105.0 F. While on antibiotics, sulfonamides, and other treatment, the temperature typically dropped to 102.8 to 103.5 F., and occasionally to normal for one reading, not because of the effect on the principal infective agent but most likely due to the controlling of opportunistic invaders that multiply in the presence of an animal's generally lowered resistance. In fact, failure of a coughing dog to respond to broad-spectrum antibiotic therapy, as indicated by continued coughing and persistent temperature elevation, was the earliest method by which a diagnosis of coccidioid infection was reached. Due to the extended course of the disease, it has been considered a help to the clinician if the dog's owner will keep a twice daily temperature record.

**Appetite.**—Poor appetite was found to be a common early symptom of coccidioid infection, but under the treatment mentioned above, plus added vitamin B complex, the appetite generally returned. Fluctuations in the desire for food were common but usually the affected dog was eager for food. Good appetite coupled with persistent fever has come to be considered indicative of coccidioidomycosis in the dog.

Some dogs approached food eagerly but exhibited symptoms of choking upon swallowing the first mouthful. The typical wolfing of food would stop immediately, the dog would back away from the pan, swal-

low convulsively several times, and assume a worried, distressed look. When this passed, the dog would usually proceed to eat, but slowly and with caution. Hand feeding of small amounts at a time has been necessary with some such dogs.<sup>5</sup> It is assumed in these cases that the granulomatous enlargement of lymphoid tissue at the hili of the lungs restricts passage of food through the esophagus in that area.

**Loss of Weight.**—Weight loss was seldom rapid, usually being in proportion to the duration of illness. Most dogs were destroyed after therapeutic attempts failed.

**Diarrhea.**—Most of the dogs permitted to live beyond the period required to reach a definite diagnosis developed intermittent diarrheas.

**Lameness and Bone Involvement.**—Of the 52 dogs studied, 25 developed bone and joint lesions with associated symptoms, 3 exhibiting symptoms of sharp pain in various parts of the body, but lesions could not be located by radiographs or on necropsy. Painful enlargements (fig. 2) of the extremities of the long bones associated with swollen joints characterized the spread of infection to the skeleton. Such symptoms occurred late in the course of progressive infection, usually after several months, many developing after apparent recovery from other effects of the disease. A period of pain was demonstrated before a lesion became obvious or could be demonstrated by radiographs. Disuse atrophy of muscle groups also preceded gross development of lesions.

Several coccidioid infections of the bone, diagnosed and confirmed in the absence of other symptoms, had apparently been incurred as mild initial infection. Many animals had been under veterinary care since weaning and hospital records, when complete, showed a period of treatment for coughing and fever, sometimes a year earlier. These are the only cases which suggest that dogs may overcome the primary infection, even temporarily.

**Circulatory Disturbance.**—Ascites, cardiac cough, anemia, muffled heart sounds, and an abnormally regular but thready pulse have been observed, all associated with involvement of the pericardium and heart. Edema of a hindleg in 1 dog lasted for six months, until euthanasia. Local lymph nodes enlarged and became progres-



Fig. 2 Coccidioid bone lesion in the distal radius of a dog.

sively more firm, and though the amount of excess tissue fluid fluctuated from time to time, no appreciable improvement occurred in response to treatment.

#### LESIONS

Gross and microscopic pathology of canine coccidioidomycosis has been adequately described.<sup>1,2-5,7,8</sup> A few findings not previously mentioned will be included in this report.

**Lungs.**—Necropsy revealed raised, spherical lesions in the lungs of many of the dogs. They were a pale, translucent gray and their intensity varied in a concentric pattern, giving the impression of a "bull's eye." The lesions varied from 2 to 6 mm. in diameter and numbered from 5 or 6 in the entire organ to 40 or 50 in each lobe. Depressed, pale gray, stellate scars were found in some lungs, particularly in those of dogs destroyed because of skeletal involvement and in which there had been



apparent recovery from the initial infection. The lungs of several dogs contained large granulomas in the parenchyma, section of which revealed a fibrous wall surrounding a cavity filled with thin, purulent exudate. Spherules were easily demonstrated by placing a coverslip over a drop of this exudate and examining it microscopically with reduced light. Another commonly encountered lesion was a yellowish trabeculate pattern of dense tissue distributed throughout the lung parenchyma but also evident on the surfaces. Such lungs were firm, collapsing incompletely when the thorax was opened. Whereas histological section of the first lesions described revealed small granulomas, the latter type consisted principally of collagenous tissue. Adhesion of lung to adjacent surfaces was not uncommon.

**Bronchial Lymph Nodes.**—Granulomatous involvement of lymphoid tissue at the hili of the lungs was found in all stages from early cellular infiltration to acellular cicatrix formation, the process being referable in part to duration of infection and in part to the extent to which the dog succumbed to the disease. Purulent centers of lymph node granulomas were good sources of material for culture and for wet-mount demonstration of spherules.

**Heart and Pericardium.**—Pale yellow elliptical lesions 3 to 6 mm. long were found in heart muscle in some dogs. More serious involvement consisted of diffuse fibrinopurulent pericarditis and epicarditis which led to formation of adhesions between pericardium and heart or pericardium and lung or diaphragm. A radiograph made of 1 dog's thorax revealed an enlarged heart shadow. On necropsy the enlargement was found to consist of granulomatous pericardial tissue distended with purulent exudate. The myocardium had suffered extensive atrophy and destruction of muscle fibers and was broadly adhered to the pericardium at the apex.

**Liver, Spleen, and Kidney.**—Typical liver lesions were described by Smith.<sup>7</sup> The splenic lesions found in this study were generally small, 1 to 2 mm., white, and slightly raised above the surface of the organ, or they appeared as rough encrustations along the margin of the ventral extremity. Kidney lesions appeared

as depressed pale areas on the surface of the organs. The anterior half of one kidney was reduced to little more than scar tissue in 1 dog. Incision through a typical depressed area revealed a conical infarct extending into the cortex.

**Bone and Joints.**—In contrast to previously reported coccidioidal infections of the skeleton,<sup>1,4</sup> these dogs suffered affections of the long and short bones only, and lesions were found in the proximal and distal extremities only. The external appearance of bone lesions varied with location, but generally they were manifest as smooth, firm enlargements (fig. 2) neighboring, and often including, joints. Actual infection of joints and tendon sheaths was evidenced by increased amounts of synovia from which the fungus could be cultured and by gross inflammation of associated soft tissues. Bone lesions from 2 dogs yielded thin, purulent exudate on section. The organism grew readily from inoculations of this exudate on Sabouraud's agar.

**Corneal Opacity.**—Involvement of the eye was reported in one previous paper.<sup>8</sup> Glaucomatous swelling of one eye with clouding of the cornea occurred in 2 dogs covered by this report. *Coccidioides immitis* was found on culture and histopathological section in the affected eye of 1 animal. The process was characterized by cellular infiltration of the cornea and, more extensively, the ciliary body, associated with spherule development in the area of the ciliary body and in the anterior chamber of the eye.

**Sinus Formation and Open Wounds.**—Development of a subcutaneous abscess with sinus formation occurred in 4 dogs and the organism was cultured from all lesions. In 2 dogs, the draining abscess occurred over the rib cage and in the other 2 in the facial region. Another dog with infection of the first and second phalanges of a digit developed an open wound. Attempts to amputate above the infection failed. Histological sections revealed a heavy population of coccidioidal spherules in the bone and surrounding tissues.

**Enteritis.**—A mild catarrhal enteritis was observed on necropsy of dogs that had been experiencing diarrhea.

Of the 52 dogs shown in the summary of the distribution of lesions (table 1),



diagnosis was confirmed by necropsy (48), by biopsy (1), by culture of the fungus from exudates (2), and by serology (1).

#### LABORATORY AIDS TO DIAGNOSIS

The value of roentgenograms has been discussed (p. 198).

**Culture of the Fungus.**—The fungus grows readily at room temperature, but growth is slowed by heavy bacterial contamination. It was found that inoculation of Sabouraud's agar with material from coccidioid granulomas yielded visible growth in four days and a typical fungus mat in seven to ten days. Culture of sputum, gastric washings, and feces was found to be much less productive of fungus growth, but this should not discourage similar attempts where considered practical.

**Coccidioidin-Sensitivity Tests.**—Of the 52 dogs studied, 24 were tested<sup>a</sup> by intradermal inoculation of 0.1 ml. of undiluted, and 0.1 ml. of a 1:10 dilution of, coccidioidin. All of the dogs tested gave diagnostic reactions to the undiluted material except 2, 1 of which was negative and the other doubtful. In a few instances where coccidioidin-sensitivity tests were performed soon after appearance of symptoms, a retest was necessary to get a reaction.

**Serological Tests.**—Serums from 28 of the dogs were tested for precipitins and complement-fixing antibody. Twelve serums demonstrated a diagnostic level of precipitins, 8 were doubtful, and 8 negative. Eight serums fixed complement, 1 was negative, and 19 were anticomplementary. At present, it would be improper to urge serodiagnosis to everyone, because tests are performed at only one laboratory.\*

**Biopsy.**—It was possible to confirm diagnosis before necropsy in some cases by a study of tissue sections prepared from surgically removed bone, liver lesions, and lymph nodes.

#### DISCUSSION

The 52 canine coccidioid infections upon which this report is based represent only cases available for study and confirmation of diagnosis, not the total infections diagnosed in the period covered

(Oct., 1952, to July, 1955). The disease is far from uncommon. One of the veterinarians cooperating in this study has accurately diagnosed coccidioidomycosis almost as frequently as common ringworm. Veterinarians in the enzootic area not occasionally diagnosing coccidioidomycosis may simply be failing to recognize the disease.

In three known instances, dogs were taken from the area after diagnosis of coccidioidomycosis was made and many may develop symptoms after leaving the Southwest. The popularity of this area as a winter resort area, and the increased tendency to travel with pet animals, precludes localization of the disease problem. Establishment of foci of infection outside the Southwest will not be a part of the problem, however, since the disease organism apparently does not survive outside the host in other localities, and inhalation of air-borne chlamydospores seems to be the common method of infection. There is no proof that animal-to-animal spread of infection occurs.

#### SUMMARY

The results of a study made of 52 canine coccidioid infections are reported. Course, age, and breed susceptibility, symptomatology, and common necropsy findings are outlined as a means of facilitating recognition of the disease in dogs.

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**A Metastatic Neuroma in a Bitch.**—A 12-year-old bitch with multiple uterine and vaginal fibromas was found to have a neuroma in the anterior mesenteric ganglion. —*Vet. Bull.*, Nov., 1955.

\*By Dr. C. E. Smith, University of California, Berkeley, with facilities provided by the Armed Forces Epidemiological Board.

## Listeria Infection of Bovine Mesenteric Lymph Nodes

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LISTERIA INFECTION of the central nervous system in cattle is well known and is mentioned in all recent textbooks on veterinary bacteriology, veterinary pathology, and infectious diseases of large animals. The term listeriosis, when applied to cattle, implies infection of the central nervous system with *Listeria monocytogenes*. However, this organism has been isolated on several occasions from aborted bovine fetuses. A review of the literature is given by Smith, Reynolds, and Bennett.<sup>1</sup> The purpose of this report is to describe lesions containing *L. monocytogenes* found in the mesenteric lymph nodes of 2 cows on different premises in Alabama. In 1 of these animals there also was *Listeria* infection of the central nervous system.

### CASE REPORTS

**Case 1**—A 6-year-old Hereford cow was brought to the large animal clinic (A.P.I.) on April 9, 1955, with a history of having "gone down hill" for the past two months. The cow came from a herd of 50 cattle; the rest of the animals appeared normal. Physical examination revealed a temperature of 102.6 F., pulse 74, respiration 30, diarrhea, rough coat, pale mucous membranes, and extreme inanition. The cow circled in the stall, but eventually there was muscular incoordination of such a degree that the animal was unable to remain on her feet.

Clinical laboratory examination of the blood revealed: red cell count, 5,900,000 per cmm.; white cell count, 18,750 per cmm. (neutrophils 82%, lymphocytes 17%, monocytes 1%); hemoglobin, 10 Gm.

A tentative diagnosis of listeriosis or brain abscess was made and the animal was destroyed on the second day of observation.

Postmortem examination revealed a carcass in fair condition, marked interstitial emphysema of the lungs, and edema of

the folds of the mucosa in the fundus of the abomasum. The mesenteric lymph nodes draining about 3 ft. of the jejunum were enlarged, and an incision showed large irregular areas of necrosis (fig.1). The mesentery in this area was markedly edematous. The meninges were congested, but no other gross changes were seen in the brain. A worm count on aliquot samples of the abomasal contents and washings revealed approximately 15,000 nematode parasites identified as follows: 46 per cent, *Ostertagia*; 5 per cent, *Trichostrongylus*; 11 per cent, *Haemonchus*; and 38 per cent, unidentified immature parasites.

Histopathological examination was made of the brain and the enlarged, necrotic mesenteric lymph nodes. Several areas in the brain stem showed localized perivascular infiltration associated with foci of leukocytic infiltration in the brain substance. The microabscesses contained small gram-positive bacteria morphologically characteristic of *L. monocytogenes*.

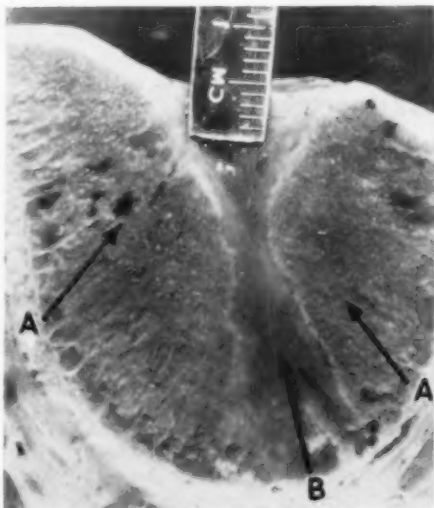


Fig. 1—Cross section of a bovine mesenteric lymph node showing two areas of necrosis (A) separated by non-necrotic tissue (B).

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Approved by the Committee on Publications, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, as publication No. 525.

The mesenteric lymph nodes contained large, irregular areas of necrosis. At the border of the necrotic areas, there was proliferation of capillaries and reticular cells but no characteristic granulomatous reaction. Just within the border, there was a dense zone of pyknotic nuclear debris evidently formed in part by necrotic cellular infiltrate. The necrotic areas contained numerous small gram-positive rods morphologically typical of *L. monocytogenes*. There also were short chains and filaments of the same organism. The histopathological diagnosis was listeriosis involving the central nervous system and mesenteric lymph nodes.

**Bacteriological Examination.**—Culture of lymph nodes on bovine blood-agar plates yielded smooth, circular, transparent, *Beta* hemolytic colonies in 24 hours at 37 C. The organism was a small gram-positive rod, motile when grown at room temperature in tryptose broth but nonmotile when grown in the same medium at 37 C.

In the semisolid medium used by Seastone,<sup>1</sup> minute colonies developed along the line of stab after 24 hours' incubation at 37 C. and there was some clouding of the medium after 48 hours of incubation (fig. 2).

Acid was produced in dextrose, salicin, and rhamnose in 24 hours at 37 C., and in sucrose, glycerol, starch, dextrin, and sorbitol by the ninth day of incubation. No acid was produced in galactose, trehalose, maltose, lactose, mannitol, inulin, inositol, arabinose, dulcitol and xylose. Hydrogen sulfide and indol were not produced, and nitrate was not reduced. Litmus milk showed a slight acid reaction and became decolorized in the bottom of the tube.

A week later the brain stem, which had been stored in a refrigerator at 9 C., was cultured on blood-agar and on potassium tellurite agar to inhibit the growth of gram-negative organisms. The growth obtained on blood-agar was contaminated with coliform bacteria, but a pure culture was obtained on the tellurite agar consisting of small, circular, black colonies. The organism isolated from the brain stem showed the same cultural and biochemical characteristics as the organism from the lymph nodes.

On the basis of these observations, the organism was identified as *L. monocytogenes*.<sup>2</sup>

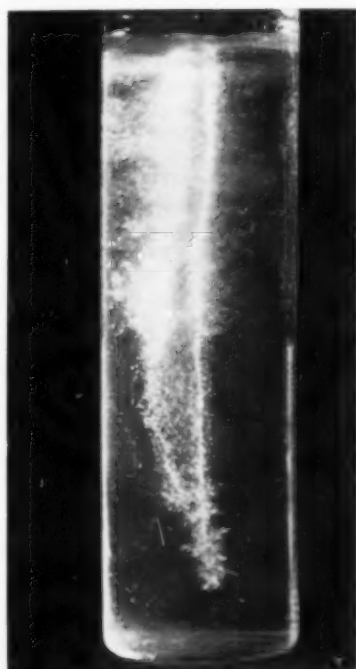


Fig. 2.—*Listeria monocytogenes* in the medium of Seastone. Note cloudiness of medium and individual colonies along the line of the stab.

**Case 2.**—A 6-month-old calf was brought to the large animal clinic on May 3, 1955, showing nervous symptoms, nasal discharge, weakness in the legs, and diarrhea. Poisoning was suspected because a case of arsenic poisoning had been diagnosed two weeks previously in the same herd. This calf had been removed from the contaminated pasture 11 days before it was brought to the clinic. Both the Reinsch test and modified Gutzeit test for arsenic in the feces were positive. Clinical laboratory examination of the blood revealed: red cell count, 6,810,000; white cell count, 8,750 (neutrophils 46%, lymphocytes 40%, monocytes 8%, eosinophils 6%); and hemoglobin 13 Gm.

The calf was destroyed on the fifth day of observation.

Postmortem examination revealed a carcass in fair condition. The lungs were congested and edematous. There were large ulcers in the mucosa of the pharynx and at the entrance of the larynx. The contents of the intestinal tract were fluid throughout, and there were ulcers in the mucosa

of the posterior third of the small intestine. The mesenteric lymph nodes appeared inflamed, and in some a few small necrotic areas were seen on section. There was some yellowish discoloration of the liver. The brain showed no remarkable gross alterations.

Histopathological examination was made of the brain, liver, kidney, small intestine, and mesenteric lymph node tissues. No significant pathological alterations were seen in the brain. The liver tissue did not appear obviously fatty in routine hematoxylin and eosin sections, but there was considerable small bile duct proliferation and the parenchymal cells were somewhat shrunken. The kidney showed necrosis and sloughing of some epithelial cells in the proximal convoluted tubules. The ulcerated areas in the small intestine showed necrosis of the mucosa extending down to and below the muscularis mucosa; there also were inflammatory edema and some inflammatory cellular infiltration of the submucosa. The pathological areas contained numerous small gram-positive organisms morphologically characteristic of *L. monocytogenes*. The adjacent mesenteric lymph nodes contained small subcapsular areas of necrosis in which there were numerous small gram-positive organisms morphologically characteristic of *L. monocytogenes*. The histopathological diagnosis was arsenic poisoning complicated by *Listeria* infection of the intestinal mucosa and mesenteric lymph nodes.

**Bacteriological Examination.**—The lymph nodes in this case had been refrigerated for ten days before cultures were made. The brain was not available for bacteriological examination.

Culture of the lymph nodes on potassium tellurite-agar yielded small, circular, black colonies. The organism was a gram-positive rod, motile when grown at room temperature in tryptose broth and nonmotile when grown at 37 C.

Identical bacteriological procedures were carried out in case 2 as those for case 1. All cultural and biochemical reactions were the same with the exception that the organism of case 2 produced acid in both lactose and maltose broth which the organism from case 1 failed to do. This variability is recorded in "Bergey's Manual of Determinative Bacteriology."<sup>3</sup>

On the basis of these observations, an

identification of *L. monocytogenes* was made.

#### SUMMARY

Two cases of *Listeria* infection in the mesenteric lymph nodes of cattle have been described. In both cases, *Listeria monocytogenes* was isolated from the affected mesenteric lymph nodes. In one instance, there also was typical listeriosis of the central nervous system. The other animal was a case of arsenic poisoning with *Listeria* infection of the mesenteric lymph nodes but not of the central nervous system.

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### A Field Rodent (*Apodemus Agrarius*) as Carrier of *Leptospira Pomona* in Denmark

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Chronic leptospirosis is apparently a more common sequel of porcine than bovine, ovine, equine, or human *Leptospira pomona* infection.<sup>1-5</sup> Since contact with infected swine has been demonstrated in many outbreaks of *L. pomona* infection, they are generally considered the principal reservoir of this organism.

The possible existence of wildlife carriers has not been adequately investigated. In Indonesia, *L. pomona* was isolated from a dog,<sup>7</sup> in Italy from a rat,<sup>8</sup> and in Portugal from a mouse (*Mus musculus lusitanicus*).<sup>9</sup> This paper reports the finding of *L. pomona* in the striped field mouse (*Apodemus agrarius*) in Denmark.

While the examination of 40,000 serums from human beings suspected of having leptospirosis, and of 1,400 rodents (including, however, only 2 specimens of

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*A. agrarius*) did not yield evidence of *L. pomona* in our country,<sup>10</sup> a recent survey<sup>11</sup> of 461 aborting cattle revealed antibodies against *L. pomona* in two serums, both originating from the neighboring islands of Lolland and Falster.

On the two farms in question, 3 additional reactors were found among 26 cattle on farm A and 1 additional reactor among 6 cattle on farm B. Microscopic examination of urine from the reactors on farm A did not reveal any leptospiras. Apparently swine were not the source of infection in

stricted to the fields, but occasionally it is found in orchards, grain stacks, and sugar-beet pits near the farm buildings.

**Summary.**—(1) *Leptospira pomona*, previously not known to exist here, has been isolated from the kidneys of 3 of 14 specimens of the striped field mouse (*Apodemus agrarius*), a rodent occurring in Denmark only on the islands of Lolland and Falster.

(2) *Leptospira pomona* antibodies were found in 13 of 200 serums of cattle and in five of 153 serums of swine from Lolland and Falster, but not in serum from 1,200 cattle or 345 swine from other parts of the country.

(3) These findings indicate that in Denmark the striped field mouse is the principal carrier of *L. pomona*.

(4) The higher rate of infection in cattle than in swine is explainable by management which favors contact between field rodents and cattle, but minimizes contact between field rodents and swine, and also between cattle and swine.

TABLE 1—Results of Examination of 32 Mice and Shrews for Leptospiras

Animal species	No. examined	Leptospiras isolated from	Serotype of leptospiras
<i>Mus musculus</i>	13	1	sejroe
<i>Apodemus agrarius</i>	14	3	<i>pomona</i>
<i>Clethrionomys glareolus</i>	3	0	.....
<i>Sorex araneus</i>	2	0	.....

these cases. Serums from 8 adult swine (and 3 cats) on farm A and from 8 adult swine on farm B reacted negatively, and no contact could be established between the cattle on these two farms and swine from other farms.

The above findings prompted us to look for carriers among the field rodents, since in Denmark cattle are pastured half the year, whereas swine are usually confined to indoor pens and only seldom are kept in small outdoor pens adjacent to the farm buildings. The examination of 32 mice and shrews trapped in the vicinity of farm A gave the results summarized in table 1.

The isolation of *L. pomona* from the striped field mouse is particularly interesting because Lolland-Falster is the only part of Denmark in which this rodent is known to occur. The finding of *L. pomona* antibodies in 13 of 200 serums of cattle originating from 100 herds on Lolland-Falster and in five of 153 serums from sows and boars representing 138 herds on these islands, but not in serums of 1,200 cattle or 345 serums of swine from other parts of the country, supports the hypothesis that in Denmark the striped field mouse is the principal carrier of *L. pomona*. The higher percentage of *L. pomona* reactors found in cattle as compared with swine can probably be explained by the greater opportunities of the former animals for contact with the striped field mouse. The habitat of this rodent is normally re-

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## Perforating Abomasal Ulcer in a Calf

ALBERT J. LUEDKE, D.V.M.; J. F. HOKANSON, D.V.M.; H. W. DUNNE, D.V.M.; Ph.D.

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In European and American literature, reports of ulcers in domestic animals vary, particularly concerning the age at which they occur most frequently in cattle. A considerably higher incidence has been reported in Europe than in this country.

### REVIEW OF LITERATURE

As reported in Europe,<sup>1</sup> ulcers, whether of peptic or nonpeptic origin, are rarely of clinical importance. Although often found in the abomasum of calves, they are found rarely in adult cattle, dogs, swine, and horses. The incidence of ulcers in one study of 1,500 abomasums from calves 4 to 14 weeks old was 78.0 to 98.0 per cent. In all young cattle, an incidence of 68.7 per cent was reported. In another report of 3,000 slaughtered calves, 23.23 per cent of the calves 2 to 8 weeks old had ulcers. In the United States,

also to the perforation and formation of adhesions and fistulas in cattle of all ages.

### DISCUSSION

It has been theorized that mechanical factors play an important role in the etiology of ulcer formation in the abomasum of calves, ulcers developing at the time of transition from a diet of milk alone to one consisting in part, or entirely, of vegetables. This generally occurs at 3 to 4 weeks of age when the rumen, not being fully developed, allows rough food to pass directly into the abomasum without sufficient rumination and without proper mixing with saliva. Ulcer formation is enhanced by a well-marked, local constriction of the abomasum in the pyloric region. This constriction forms an obstruction to food passage with resulting irritation.

In addition to the case here reported, a nonperforating ulcer was found in a calf on necropsy and other animals suspected of having ulcers apparently recovered. These findings suggest that the importance of gastric ulceration in animals as a cause of



Fig. 1—Perforating ulcer in the pyloric region of the abomasum of a calf, about 2 inches from the pylorus and located in a band (dark area) of denuded mucosa.

Jensen *et al.*<sup>2</sup> found abomasal ulcers in 2.9 per cent of 1,535 adult, fat beef cattle. Marr and Jarett<sup>3</sup> stated that ulceration of the stomach is not uncommon in cattle and reported perforation of a peptic ulcer with fatal peritonitis in a calf and also in a heifer. Reference was made to the occurrence of true peptic ulcers in 75.0 to 95.0 per cent of calves at about the time of weaning and

disease has been underestimated in the past.

### REPORT OF CASE

At 7:30 a.m., March 30, 1955, a pure-bred, 3-week-old, 150-lb., female Brown Swiss calf was unable to rise. Its body felt cold and its temperature was 99.2 F. It was vigorously massaged and covered

From the Department of Veterinary Science, Pennsylvania State University, University Park.



with a blanket. Shortly after 8 a.m., the calf was standing and showing no signs of illness. The herdsman stated that the calf had always been exceptionally alert and active. Examination revealed the following: temperature 99.8 F.; pulse 80; respiration 28; defecation normal; feces normal in color and consistency; eyes, nose, mouth, and ears apparently normal; extremities and all appendages of the body, cold. The calf evidently had not eaten since the normal feeding the previous evening. Treatment consisted of 250 cc. of a 50 per cent dextrose solution containing therapeutic doses of soluble B vitamins, penicillin, and streptomycin, intraperitoneally, and epinephrine, intramuscularly.

All calves in the herd received an initial feeding of colostrum followed with whole milk until 3 weeks of age, then a gradual and complete shift to a commercial milk-saver. Starting at 1 week of age, they received good quality hay and grain (special calf mix) free choice. Several pieces of black, hard, foreign material were found in this calf's grain cup. It was replaced with fresh grain.

At 4:00 p.m., the calf was given another physical examination and seemed perfectly normal. However, it was given antihistamine intramuscularly.

The next morning, the calf was again in a semicomatose state with opisthotonus but little tonus in the rear leg muscles. Its temperature was 99.2 F., pulse slow and weak, and its extremities were cold. Treatment, including a dextrose-calcium-magnesium solution, epinephrine, and antihistamine, produced a moderate response as evidenced by a general awakening and stronger pulse. However, by 3:30 p.m. the calf's pulse was barely perceptible and it again was in a state of opisthotonus. Epinephrine intracardially and vigorous massaging seemed not to help, but there was some response to 35 cc. of a dextrose-calcium-magnesium solution administered intracardially. However, the calf died about 8:00 p.m.

#### NECROPSY

The peritoneal cavity contained a slight increase of fluid and particles of abomasal contents. A diffuse, fibrinous, peritonitis was present. The rumen contained a small amount of food and had several small, dis-

crete, hemorrhagic foci in the ventral portion. A perforating ulcer was found in the pyloric portion of the abomasum but the pylorus was only slightly thickened. The oval-shaped ulcer (fig. 1) was 2 cm. by 1½ cm. and was located in a band of denuded mucosa 2.5 cm. or more in width which circumscribed the abomasum. This band of denuded mucosa was depressed and yellowish as opposed to the adjacent reddish mucosal surface.

Apparently, there had been a chronic ulcer which perforated during the night of March 29, causing shock and initiating an acute inflammatory reaction. Following the initial shock and aided by treatment, the calf rapidly became apparently normal. However, the constant seepage of ingesta had resulted in peritonitis, toxemia, septicemia, and death.

This demonstrates the value of performing necropsies on all calves which die from obscure causes.

*Authors' Addendum.*—The authors recently observed a grade, 11-day-old, 110-lb., male Holstein-Friesian calf that showed initial signs quite similar to those of the case here reported. The calf died within 15 hours after it was last observed when it was apparently normal. The following was observed on necropsy: peritonitis, abomasum moderately dilated with fluid and with acute ulceration, patent ductus arteriosis the size of a lead pencil, and a patent foramen ovale. The calf's ration had been changed the day preceding death.

#### References

- <sup>1</sup>Hutyra, F., Marek, J., and Maninger, R.: *Special Pathology and Therapeutics of the Diseases of Domestic Animals*. 5th ed. Alexander Eger Inc., Chicago, 1949.
- <sup>2</sup>Jensen, R., Dean, H. M., Cooper, L. J., Miller, V. A., and Graham, W. A.: The Rumenitis-Liver Abscess Complex in Beef Cattle. *Am. J. Vet. Res.*, 15, (1954): 202-215.
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[In June, 1935, while on pasture rations in Iowa, a young Holstein-Friesian cow which had been mildly ill and had eaten little for five days showed the following signs when examined on the sixth day: disinclination to move, temperature 101 F., pulse 132, abdomen full and silent, feces watery. She died in a few hours, after being given a quart of mineral oil and

some mild stimulants with a stomach tube. Necropsy revealed petechial hemorrhages on the heart, lungs, and diaphragm; peritonitis; and a 4- by 4-cm. perforation in a 4- by 6-cm. ulcer in the lesser curvature of the abomasum, several inches from the pylorus. The probable cause of the ulcer was not determined.—W. A. A.]

**Drug Prevents Bovine Tuberculosis.**—In Italy, daily subcutaneous injections of isonicotinic acid hydrazide (4 mg.) for 60 days, apparently protected calves in contact with a tuberculous calf, whereas untreated controls became infected.—*Vet. Bull., Nov., 1955.*

### Equine Infectious Anemia Control

The Commission of the International Office of Epizootics for the study of equine infectious anemia convened in Turin, Italy, Nov. 3-5, 1955, to discuss their results with a modified complement-fixation test which had been proposed by the Turin research workers in 1953. Workers from several of the 12 countries where this test had been tried had encouraging reports while others were less favorable, possibly due to divergencies in the technical procedure used. Work continues on methods for diagnosing and thus eventually controlling this disease which is of considerable importance in many countries.—*Circulaire No. 107, Off. Internat. des Epizoot., Nov. 22, 1955.*

### Equine Periodic Ophthalmia

The addition of riboflavin to the ration of horses did not prevent periodic ophthalmia. Some workers reported rapid recovery after cortisone therapy. Microscopically, the lesions differed little from those in recurrent iridocyclitis in man, the cause of which is equally obscure.—*Vet. Bull., Nov., 1955.*

### Epidemiology of Equine Encephalitis

Since Weld County, Colorado, had reported infection with western equine encephalomyelitis virus in both man and horses for many years, it was chosen for an epidemiology survey. The serums of 614 persons showed that 10.9 per cent had been infected at one time. The rate was

twice as high for those under 30 years of age, and was higher in residents of 15 to 24 years than in others, probably reflecting infection from the epizootics prior to 1941. It was also greater in farmers and others with outdoor employment, probably due to their greater exposure to mosquito vectors.—*Am. J. Pub. Health, Nov., 1955.*

### Gastric Ulcers in Adult Cattle

Three dairy animals with perforating ulcers of the abomasum were encountered in one practice in Britain in 1952. The Guernsey bull had been sick five days and, on necropsy, had a smooth-edged, 1-cm. perforation through the greater curvature of the abomasum but no other ulcers. The cows had been ailing longer. Each had one perforation but more than one abomasal ulcer. *Fusiformis necrophorus*-like organisms were isolated from the necrotic tissue in one of the ulcers.

All 3 animals died within 24 hours of the appearance of the acute symptoms which probably indicated the time of perforation. It was assumed that the ulcers resulted from an injury, possibly by a foreign body, and that infections caused the perforations. In the early stages, the symptoms resembled those of traumatic gastritis. It was suggested that the perforations probably would occur before professional advice was sought.—*British Vet. J., Oct., 1955.*

### Increasing Rumen Flora Activity

Unidentified factors in hydrolyzed substances containing various kinds of protein were found, at Iowa State College, to increase the activity of beneficial rumen organisms in cattle. Activity was stimulated as much as 225 per cent by hydrolyzed feather meal, 177 per cent by hydrolyzed casein. Others resulted in smaller increases.—*Successful Farming, Jan., 1956.*

**Atrophic Rhinitis and Pig Size.**—Pigs infected with atrophic rhinitis were significantly lighter than their normal litter mates, the analysis indicating that those which are smaller at birth may be more susceptible. Forty-nine of this Canadian herd of 234 pigs were affected, but only 3 of the 27 sows which farrowed both infected and normal pigs had lesions.—*Vet. Bull., Oct., 1955.*

## What Is Your Diagnosis?

Because of the interest in veterinary radiology, the JOURNAL publishes this month and will continue to do so for the next several issues, a case history and accompanying radiographs depicting a diagnostic problem.

**Make your diagnosis from the pictures below—then turn the page ►**

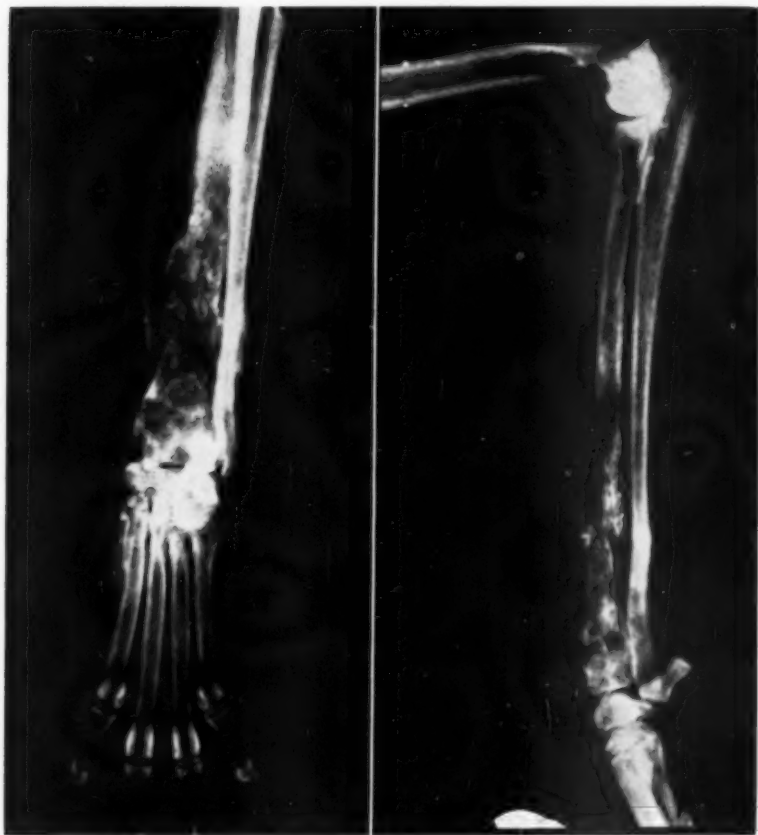


Figure 1

*History.*—An 11-year-old "farm Shepherd" male was lame in the left foreleg. The leg had been severely injured one and a half years previously. The injury healed except for a small swelling which was visible at the distal end of the "forearm," just above the carpus. However, for the previous six weeks the enlargement had been increasing in size. When seen by the attending veterinarian, the swelling had extended to the elbow, was painful when touched, and the skin was reddened. A radiograph was taken.

## Here Is the Diagnosis

(Continued from preceding page)

**Diagnosis.**—A bone tumor, it is probably an osteogenic sarcoma resulting in erosion and fracture of the distal end of the radius and beginning erosion of the distal end of the ulna.

**Comment.**—Amputation was recommended and accepted; histopathological studies of the specimen revealed the tumor to be an osteogenic sarcoma (osteoclastic type). The dog recovered satisfactorily from the amputation, but three months

later nodules appeared in the skin in several areas and euthanasia was performed.

This case was submitted by Drs. Nyles Van Hoosen and R. R. Isham, Auburn, Wash. The histopathological studies were done by Dr. G. R. Spencer, Department of Veterinary Pathology, Washington State College, Pullman.

Our readers are invited to submit case histories, radiographs, and diagnoses of interesting cases which are suitable for publication.

### Toxoplasmosis and Canine Distemper

Toxoplasmosis in dogs is probably more prevalent than has been suspected. Undoubtedly it is a complicating factor in many diseases, the most common of which is probably canine distemper. In each of 16 dogs in Britain with canine distemper complicated with toxoplasmosis, if histological studies had not been made the evidence of toxoplasmosis would have been missed, as signs were not distinctive enough to cause suspicion that it complicated the viral infection.—*Vet. Rec.*, Sept. 17, 1955.

**Induced Newcastle Disease in Pups.**—Puppies 2 to 5 days old developed nervous symptoms after intercerebral inoculation of a strain of Newcastle disease virus. The virus could be isolated from their brain up to ten days after infection.—*Vet. Bull.*, Aug., 1955.

### Otodectes Cynotis in Dogs and Cats

References in the literature to the incidence of *Otodectes cynotis* in dogs and cats are surprisingly scarce. Of 554 dogs examined in the London area over a three-year period, the percentage found infected was 2.5 during 1952, 3.5 in 1953, and 2.8 in 1954. Of 513 cats, it was 23.5 per cent in 1952, 20.2 in 1953, and 28.4 in 1954. These findings indicate either that otodectic mange is more common among cats than dogs, or that it is more easily recognized because of the greater number of mites present. This study did not indicate that resistance increased with age. Diagnosis of ear mites

were made by examining cerumen under the microscope. With the technique used, there were usually only a few mites demonstrated in dogs, while in cats the infestations were usually heavy.—*Vet. Rec.*, Sept. 17, 1955.

### Experiments with Antiamebic Drugs

A comparison of monkeys, hamsters, dogs, and other small animals indicated that dogs were the most useful for studying intestinal amebiasis in man. The drugs most effective against *Endamoeba histolytica* and *Endamoeba criceti* were chlorotetracycline, oxytetracycline, and fumagillin. For dogs, the therapeutic dosage was two to four times that for man.—*Antibiotic Med.*, Nov., 1955.

### Salmonella Infections in Dogs

Of four epizootics of *Salmonella* infection studied in Europe, three were in dogs, particularly puppies, and one in cats. Most were caused by *Salmonella typhimurium* but in one large kennel, *Salmonella enteritidis*, *Salmonella danyasz*, and *Salmonella choleraesuis* were also found. The mortality was high.—*Vet. Bull.*, Aug., 1955.

**Newcastle Disease Carried by Rats.**—Active Newcastle disease virus was found in the excreta of common rats 72 hours after they had eaten infected chickens. That the virus was not found in rats killed after seven days indicated they were mechanical carriers.—*Vet. Bull.*, Nov., 1955.

## Myelogenous Leukemia in a Cat

HANS MEIER, D.V.M., and  
DONALD F. PATTERSON, D.V.M.

*Boston, Massachusetts*

This case of myelogenous leukemia, observed at the Angell Memorial Animal Hospital is reported because this type of leukemia is seldom seen in cats.

### CASE HISTORY

On March 10, 1955, an 18-month-old female tabby cat was presented with a history of having given birth to a litter of 4 normal kittens six weeks previously. One week before entry, she became anorectic and seemed weak in the hind legs. Weakness had progressed gradually until she was barely able to move.

On examination the cat was weak, dehydrated, the mucous membranes were extremely pale, and her temperature was 102 F. Withdrawal of a blood sample from the radial vein resulted in prolonged bleeding at the site of the needle puncture. She died 48 hours after entry.

An examination of the blood showed:

Leukocytes \_\_\_\_\_ 60,900/cmm.  
Red blood corpuscles \_\_\_\_\_ 1,190,000/cmm.  
(method of Wintrobe)  
Hematocrit \_\_\_\_\_ 7 per cent  
Hemoglobin \_\_\_\_\_ 2.2 Gm./100 cc.

### Differential:

Myeloid series total \_\_\_\_\_ 93 per cent  
Neutrophils:  
Segments \_\_\_\_\_ 0 Myeloblasts \_\_\_\_\_ 1  
Bands \_\_\_\_\_ 3 Eosinophils \_\_\_\_\_ 0  
Metamyelocytes \_\_\_\_\_ 1 Basophils \_\_\_\_\_ 0  
Myelocytes \_\_\_\_\_ 84 Lymphocytes \_\_\_\_\_ 7  
Promyelocytes \_\_\_\_\_ 4 Monocytes \_\_\_\_\_ 0

One mitotic myeloblast was observed in 100 cells. The majority of cells were myelocytes and were huge with large, round, eccentric eosinophilic nuclei and deeply basophilic cytoplasm containing a variable number of acidophilic granules. There were many smudge cells and a few degenerating band forms. A moderate number of pro-rubricytes, rubricytes, and metarubricytes were seen (fig. 1 and 2). The only leukocytes, other than those of the myeloid series, were a few small lymphocytes.

Dr. Meier is a resident in pathology and Dr. Patterson is an intern at The Angell Memorial Animal Hospital, Boston, Mass.

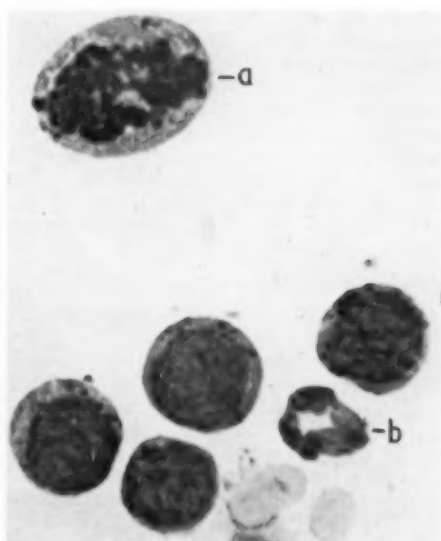


Fig. 1—Peripheral blood from a cat with leukemia, with dividing myeloblast (a) four myelocytes with variable numbers of cytoplasmic granules, and a neutrophilic band form (b). Wright's stain;  $\times 1,920$ .

### GROSS PATHOLOGY

The cat was in poor nutritional state with a rough, dry coat. The mucous mem-

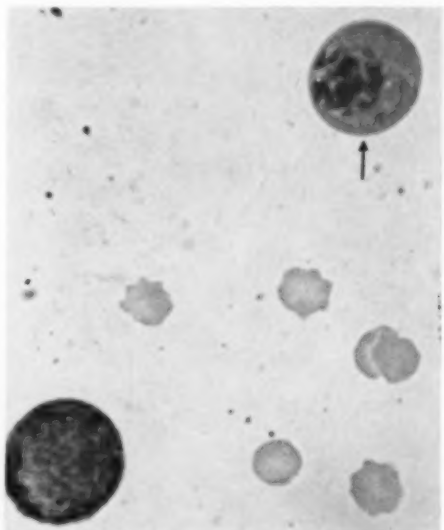


Fig. 2—A myelocyte and a prorubricyte [arrow] from peripheral blood of the cat. Wright's stain;  $\times 1,920$ .



branes and the scant adipose tissue had a slight yellow tinge. The lymph nodes appeared normal but were soft. The musculature was pale and watery. The liver was enlarged with rounded edges, was dark red, and had a mottled appearance. Its consistency was crisp. The spleen was twice normal size, soft, and dark red. The femoral bone marrow was abundant and pale red. The remainder of the organs appeared normal.

#### HISTOPATHOLOGY

*Liver.*—Zonal round cell infiltration extended to a varying degree around the portal triads, invaded the liver sinuses, and accumulated around the central vein (fig. 3). The cells varied considerably in size and shape. The largest had vesicular nuclei with one to two nucleoli and a small, moderately basophilic cytoplasmic rim. The nuclei were smaller and the nuclear shape was irregular, ragged, and slightly lobulated, as the cells diminished in size. The cytoplasm of the smaller cells was brighter and contained nonspecific polychromatic granules. Mitotic figures were present. There were small cells with hyperchromatic

nuclei and a light eosinophilic cytoplasm. A small number of huge cells with dark, multilobular nuclei were found lying within the cellular aggregations. The liver cord cells appeared distorted by the cellular infiltration and there was centrilobular atrophy with vacuolization. The parenchymal cells showed slight hemosiderin pigmentation.

*Spleen.*—In the spleen, severe hyperplasia of the red pulp and extreme atrophy of the follicles was evident. Primitive cell forms prevailed and were characterized by their large size, huge nuclei, and one to several nucleoli. Mitotic figures were frequent. Many transitional cell types occurred, grading out to small cells with dark band-form or lobular nuclei. Very small cells with round hyperchromatic nuclei were aggregated in small foci. Giant cells with multilobular nuclei were numerous. Some veins revealed subintimal cellular infiltration (fig. 4).

*Lymph nodes.*—The reticular portion of the lymph nodes was hyperplastic and the lymphoid tissue was reduced. The follicles were diminished in size and appeared of secondary type due to the disappearance of the lymphocytopenic centers. The marginal sinuses appeared packed with malignant cells.

*Bone Marrow.*—There was hyperplasia of the myeloid elements of the bone marrow. Many big cells with large, hypochromatic, roundish nuclei, various nucleoli, and dark cytoplasm were seen. These precursored a smaller cell type with a somewhat irregular and deeper-staining nucleus. Their cytoplasm was slightly brighter and contained tiny eosinophilic, basophilic, and neutrophilic granules (fig. 5). Most of the erythroid cells were small rubricytes, easily recognized by dark round nuclei and light acidophilic cytoplasm. Mature and premature cells of both series were absent. Myelocytes appeared as the most advanced developmental stage of the granulocytes (shift to the left). Megakaryocytes were not numerous.

*Kidneys.*—Some small foci of large cells with ballooned nuclei were seen in the subcapsular and medullary regions of the kidneys. The nuclei appeared hyperchromatic, the chromatin accumulating along the nuclear wall, and contained several nucleoli. Mitoses were numerous. A great number of small cells with typically dark nuclei and a light eosinophilic cytoplasm were in-

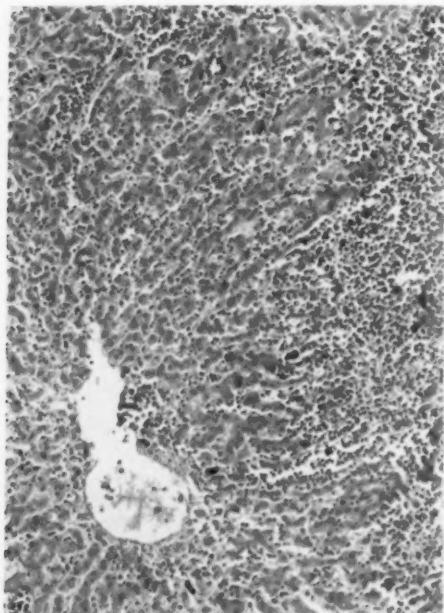
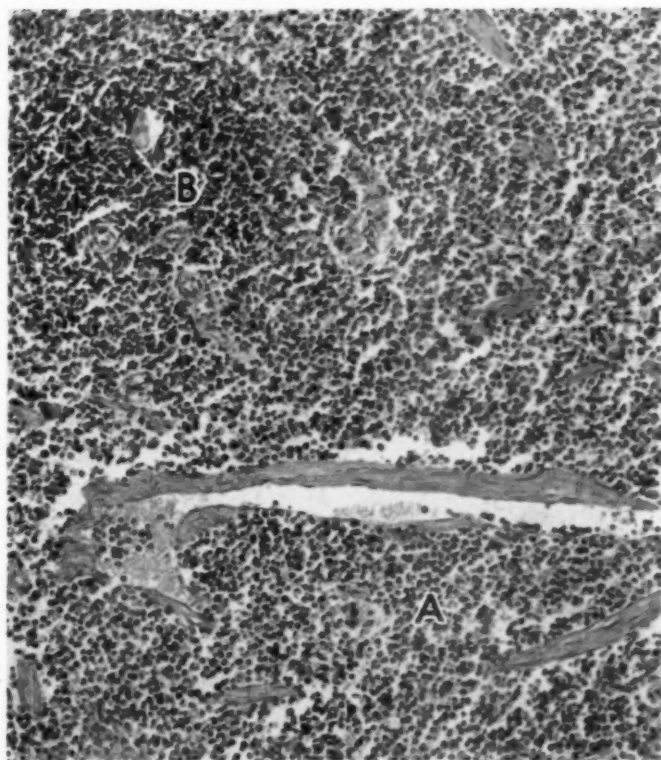


Fig. 3—Lobule of the liver of the cat showing leukemic infiltration and invasion of the liver tissues. Hematoxylin and eosin stain;  $\times 160$ .



Fig. 4—Myeloid metaplasia of the splenic pulp of the cat showing invasion of blood vessel walls with subintimal accumulation of tumor cells (A) and atrophy of the follicles (B). Hematoxylin and eosin stain;  $\times 200$ .



termingled with the more primitive cells.

**Heart.**—A tiny myocardial focus on the heart contained primitive cells of identical appearance to those seen in the liver, spleen, and kidney.

#### DISCUSSION

A diagnosis of myelogenous leukemia was suggested on the basis of an examination of the blood film. The great number of primitive cell types were identified by their morphological appearance with Wright's stain and by the supravital technique. The majority were myelocytes. A helpful clue in their identification was the occurrence of a sufficient number of both younger and more mature developmental stages.

Differentiation between myelogenous and lymphatic leukemia created no differential diagnostic problem in this particular case, for the vast majority of cells were easily recognized as myelocytes. Recognition of myeloid leukemia is difficult when the prevailing cell types are in the blast stage,

because of the morphological similarity of myeloblasts and lymphoblasts.

Several mitotic figures in the peripheral blood were indicative of a rather acute type of leukemia; however, there was sufficient time for myeloid metaplasia in various organs, demonstrated by hyperplasia of the red pulp leading to splenic enlargement, swelling of the liver due to leukemic infiltration, and reticular hyperplasia of the lymph nodes. Leukemic invasion was also present in the heart and both kidneys. The hyperplastic red bone marrow had almost entirely replaced the fat tissue and consisted of incompletely developed, densely packed cells. In Giemsa-stained sections, undifferentiated blast cells and myelocytes of all kinds occurred. There existed a marked myeloid shift to the left, since in most fields the myelocytes represented the most mature myeloid cell. Erythropoiesis seemed active in some areas despite the anemia, but lacking in others, and megakaryocytes were rare. The leukemic infil-

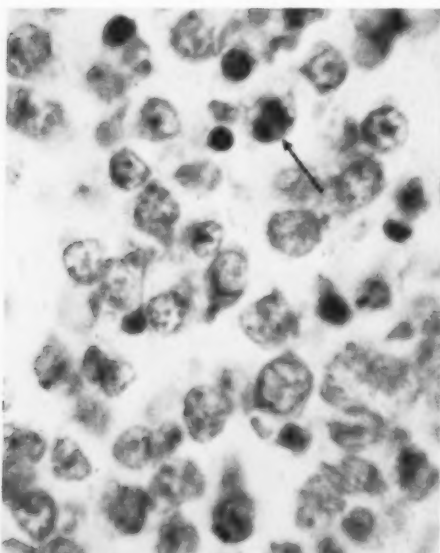


Fig. 5—Hyperplastic bone marrow of the cat with prevailing myeloid elements and shift to the left; also frequent mitosis (arrow). Giemsa stain;  $\times 960$ .

tration in the liver was so extensive that almost a quarter of the parenchyma was replaced, with leukemic cells not only around the portal triads but also invading the sinuses. The red pulp of the spleen resembled the bone marrow. The subintimal vascular invasion by tumor cells might be interpreted merely as nonspecific phenomenon in leukemias with high counts rather than a characteristic feature of myelogenous leukemia. The morphological picture of the cells in the bone marrow and the organs infiltrated by leukemic cells was identical and the cells were considered as undifferentiated stem cells, blasts, and myelocytes.

#### CONCLUSION

A diagnosis of myelogenous leukemia of the cat was established by the occurrence of primitive blood cells which were identified as cells of the granulocytic series. Mitotic figures indicated an acute type of leukemia. Myeloid hyperplasia and a shift to the left in the bone marrow, increased amount of splenic red pulp, an almost complete absence of white matter, and leukemic infiltration of the liver, kidneys, and heart justified the diagnosis. Severe anemia, in-

dicated by the low erythrocyte count and hemoglobin level, resulted from crowding out of the erythropoietic tissue of the bone marrow. Marked extramedullary erythropoiesis was considered an expression of latent erythropoietic potentialities of various mesenchymal structures. The total amount of extramedullary erythropoiesis, however, was inadequate to compensate for the severe myelophthisis.

#### Jaundice in Canine Distemper of Raccoons and Ferrets

Three strains of distemper virus (DV) which induce bilirubinemia and jaundice have been isolated—2 from wild, sick raccoons (*Procyon lotor*) and 1 from a shipment of sick ferrets. They have been designated as the  $R_1$ ,  $R_2$ , and  $F_1$  strains of virus. Of 42 raccoons which became ill following intraperitoneal inoculation with these strains, 25 developed obvious jaundice. Serum bilirubins from sick raccoons ranged from 0.3 to 11.8 mg./100 ml. For both raccoons and ferrets, 0.3 mg./100 ml. was found to be the upper limit of normal.

Following inoculation with the  $R_1$  and  $F_1$  strains of virus, 23 ferrets developed distemper. Their serum bilirubins ranged from 0.3 to 18.4 mg./100 ml. at the height of disease. Jaundice was encountered in only 1 ferret. It was believed that the pink fat of ferrets makes jaundice difficult to detect. Raccoons have white fat. Clinical manifestations and course of disease and inclusion bodies encountered in histological sections of diseased tissues, both from the 2 original raccoons ( $R_1$  and  $R_2$ ) and from the experimental raccoons and ferrets, indicated that the disease was due to distemper virus. Cross-immunity tests provided further proof. Thus, of 10 ferrets which received avianized distemper vaccine and resisted challenge with virulent distemper virus of canine origin, 9 resisted subsequent challenge with the  $R_1$ ,  $R_2$ , and  $F_1$  strains of DV. Also, of 5 raccoons and 7 ferrets vaccinated three weeks previously, all but 1 ferret resisted similar challenges. Expectedly, 100 per cent of ferrets and 50 per cent of raccoons should develop distemper and die following intraperitoneal inoculation of the  $R_1$ ,  $R_2$ , and  $F_1$  strains of DV.—L. Kilham *et al.*, *Am. J. Vet. Res.*, (Jan., 1956):144-148.

### Excessive Frothing in Rumen Produced by Fresh Legume Tops

The explosive escape of frothy reticulo-rumen contents which followed removal of the plug cap from a rumen fistula in a cow which had been subjected to a sudden change from a ration of good grade alfalfa hay to fresh prebloom Ladino clover tops clipped and fed in the manger is shown in figure 1. Such a change is

been induced by such changes in feed. In 2 fistulated animals, such intraruminal pressures developed to the point of great discomfort, anxiety, labored breathing, and collapse, but immediate removal of the cap, allowing rapid expulsion of frothy digesta, resulted in immediate relief in each instance.

Examination of results of measurements of apparent surface tensions and relative viscosities of strained ventral sac contents

Fig. 1—The expulsion of frothy contents of the reticulorumen from a fistulized rumen of a cow, following removal of the plug.



thought to approximate a circumstance which has been frequently observed to occur during pasturing on young legumes when the animals select legume tops in preference to less palatable coarser material or must consume the legumes to obtain enough feed to satisfy their hunger. Several periods of excessive frothing have

removed before feeding and at various periods after feeding suggest increases in surface tension and viscosity during the feeding of fresh legumes and excessive increases in viscosity during periods of excessive frothing.—R. E. Nichols, D.V.M., Department of Veterinary Science, University of Wisconsin, Madison.

### Vitamin E Deficiency in Swine

A fatal liver necrosis developed when pigs were fed a vitamin E-deficient ration. Three of the 6 pigs died suddenly from acute hemorrhagic necrosis. Two survivors, when slaughtered, had a postnecrotic cirrhosis of the liver. No liver damage was found in 6 control pigs fed the same ration but supplemented with alpha-tocopherol acetate.—*Vet. Bull.*, Nov., 1955.

At present, fish represent only 2 per cent of the world's food supply.

### Pantothenic Acid Needs of Baby Pigs

Baby pigs removed from the sow when 4 days old and individually fed on a basal milk ration all died within 40 days when deprived of pantothenic acid. They developed a severe diarrhea within two to four weeks and a locomotor incoordination a week or ten days later. Pigs given 12.5 to 15.0 mg. of calcium pantothenate, per kilogram of solids fed, made normal gains and did no scouring or "goose-stepping".—*The Feed Bag*, Dec., 1955, from *J. Nutr.*, Sept., 1955.

## How Many Stomachs Has a Ruminant?

The stomach of the ruminant, because it is so different from that of other animals, has always been an intriguing organ. Whether, when casually mentioned, it has been considered as one organ with four compartments or as four separate organs may have seemed of little consequence. However, with the increased attention it is receiving, because of investigations in rumen digestion and in problems such as tympanites, traumatism, and displacement of, or ulcers in, the abomasum, correct definition assumes greater importance. Recent attempts to prevent trauma in so-called "hardware disease" by various uses of magnets will doubtless enhance the public's interest in, and discussion of, this organ.

If the description of the ruminant stomach has been incorrect it should be changed. However, this should be done only with the approval of recognized authorities. The question in this case is, who are the authorities?

It is disturbing to find that the medical dictionaries, all of which were compiled primarily for human medicine, are not in accord with leading veterinary authorities on this subject. The dictionaries describe the rumen as the "first stomach," the reticulum as the second, et cetera. We believe that all of the modern textbooks (written or revised since 1900) on veterinary anatomy and on veterinary physiology, consider the ruminant as having a single stomach which consists of four compartments—the rumen, reticulum, omasum, and abomasum. Sisson states "... the first three parts are often regarded as proventriculi or esophageal sacculations since they are lined with mucous membrane covered with squamous epithelium." Duke states "... it is incorrect to ... regard the ruminant as having more than one stomach."

Since dictionaries are more accessible than veterinary textbooks, it is not surprising that we should find *Science News Letter* (Sept., 1955, p. 188) referring to "the extra stomach, the rumen, where rough feed is predigested . . ." or that most lay writers refer to four stomachs. It is disconcerting, however, to find veterinarians writing or talking about the "stomachs," or referring to "polygastric" animals.

The abomasum, which is the "true" or gastric juice-secreting compartment, and the omasum might well be considered as

distinct organs. However, both structurally and functionally, this is not so with the rumen and reticulum. They could more logically be considered as one organ partially divided by muscular pillars or folds into five "sacs," with the most anterior sac (the reticulum) having a variation (the "honeycomb") in its mucous membrane. Sisson states "... dorsally no natural separation exists, the rumen and reticulum together forming a domelike vestibule on which the esophagus terminates."

Because of the free movement of ingesta between the rumen and reticulum, those doing research on ruminant digestion have a problem in describing their work. Fistulas are made into the rumen, but what is removed or escapes (see fig. 1, p. 215) through this opening may come from both compartments. Logically, if any changes were considered the one most needed is a single name for the combined rumen and reticulum. The commonly used term "paunch" might be redefined to include both. Then if the medical dictionaries could be induced to change their definitions and if all teachers would conform, a solution to this awkward conflict in terminology would be underway.

Laymen might be hard to convince but our stand would be correct.

### AVMA Stand on Social Security

All AVMA members should read the statement on Social Security appearing on advertising page 12 of this issue.

The decision made by the House of Representatives in Minneapolis last August was not arrived at in haste nor without a full presentation of facts by those for and against compulsory coverage for self-employed veterinarians.

It must also be stated that this question has been studied by AVMA committees and by constituent associations for more than two years (see *JOURNAL*, Oct., 1953: 362).

On April 1, 1954, a statement was filed with the Congress, recommending that self-employed veterinarians be permitted to participate in Social Security on a voluntary basis (see *JOURNAL*, June, 1954: 488). These statements expressed, in so far as could be determined, the opinion of the majority of the self-employed AVMA members.

## ABSTRACTS

### Laboratory Studies on Erysipelas

*Erysipelothrix rhusiopathiae* cultures from five domestic and foreign sources were administered to 25 susceptible pigs by scarification, using 5 pigs for each culture. Temperatures were recorded and pigs were observed for incidence of clinical disease and scarification sites were examined for extent of erythema daily for eight days following scarification. Shuman's classification of the results of scarification were used: immunity=absence of local reaction; incomplete immunity=transient and slight local reaction; susceptibility, localized=persisting local reaction; susceptibility, generalized=persisting reaction becoming generalized. If any reaction was obtained at any scarification site, the reaction was recorded, and final classification of the animal was made on the basis of the maximum reaction. The Shuman strains of culture, pooled before use, produced the maximum cutaneous and febrile reactions and clinical symptoms. The Shuman classification was readily applied in recording cutaneous reactions.—[H. E. Gouge, R. Bolton, and R. Brown: *Laboratory Studies on Erysipelas. II. Use of Various Cultures in Production of Infection in Pigs by Skin Scarification*. *Am. J. Vet. Res.*, 17, (Jan., 1956): 132-134.]

### Graded Obstruction of Pulmonary Circulation

The frequency of occurrence of normal or abnormal physiological conditions associated with changes in blood volume and urine flow continues to act as a stimulus to the search for a volume receptor-mechanism which logically relates the two. Previous investigations have indicated the thoracic viscera as being a probable site for such receptors. The techniques described here were used in 62 experiments on chloralose-anesthetized dogs. Specifically, the techniques are infusion of plastic beads to congest the pulmonary circulation upstream from the small pulmonary artery radicles, snares to congest upstream from the retropericardial pulmonary veins, and a balloon to congest upstream from the left atrium.—[Jobnie L. Reeves, James P. Henry, and Otto H. Gauer: *Three Methods of Inducing Graded Obstruction of the Pulmonary Circulation*. *Am. J. Vet. Res.*, 17, (Jan., 1956): 98-102.]

### Studies on Anthrax Vaccine

Anthrax vaccine was prepared from a non-encapsulated strain of *Bacillus anthracis* and was administered subcutaneously to guinea pigs in a dose of 1 ml. containing  $5 \times 10^5$ ,  $5 \times 10^6$ , or  $10^7$  cells. In some tests, two doses were administered at an interval of seven days. Either 14 or 21 days postvaccination, vaccinated animals and unvaccinated controls were challenged by the subcutaneous injection of 1 ml. of either the Pasteur No.

2 or No. 3 type of culture, representing 1, 10, or 20 to 30 m.l.d. Animals were observed for ten days postchallenge. Only the number of immunizing doses and the Pasteur type of challenge influenced survival after challenge. Further immunity studies in guinea pigs demonstrated almost complete protection with one dose of the vaccine containing between 10 and 40 million spores against a uniform challenge with Pasteur No. 3 strain representing about 10 m.l.d. The survival rate began to decrease perceptibly at 5 million spores, and at 1 million spores less than 50 per cent of vaccinated animals survived. In safety tests, 34 sheep and goats were vaccinated subcutaneously with vaccine containing 1 to 10 billion viable spores, i.e., 50 to 500 times the recommended dose, and all survived. In immunity tests, 25 to 26 sheep, vaccinated with one 1-ml. dose representing  $2 \times 10^7$  viable cells, survived challenge which was lethal for 20 to 21 controls.—[G. Personeus, M. S. Cooper, and R. C. Percival: *Studies on an Anthrax Vaccine Prepared from Nonencapsulated Variants of Bacillus Anthracis*. *Am. J. Vet. Res.*, 17, (Jan., 1956): 153-156.]

### Gaseous Requirements for Vibrio Fetus

Carbon dioxide in concentration greater than that usually present in air is not essential for the growth of *Vibrio fetus*. Many strains are apparently sensitive to hydrogen, showing increased growth in its presence. Hydrogenase activity is demonstrable for some strains. The cultures examined were divided into: (1) the catalase-negative group from bull semen or bovine vaginal mucus, and (2) the catalase-positive group from ovine and bovine abortions. Ovine and bovine abortion isolates could be identified on the basis of origin. Ovine strains produced visible growth, and bovine strains did not, when cultivated in an environment of air (24 mm. mercury) and nitrogen (676 mm. mercury).—[C. V. Reich, E. V. Morse, and J. B. Wilson: *Gaseous Requirements for Growth of Vibrio Fetus*. *Am. J. Vet. Res.*, 17, (Jan., 1956): 140-143.]

### Glycemic Levels and Rumen Motility in Sheep

The effects of injections of glucose, insulin, and fructose on rumen motility were studied using 7 sheep with permanent rumen cannula-fistulas. An induced hyperglycemia, due to an injection of 50 per cent glucose solution at a dose of 1 Gm. per kilogram of body weight, provoked an inhibitory effect on rumen motility. An induced hypoglycemia, caused by an intravenous injection of 1 unit of insulin per kilogram of body weight, resulted in a stimulation of rumen contractions preceded by a transitory inhibition period. The induced hypoglycemic hypermotility was inhibited by injection of a 50 per cent glucose solution in a dose of 1 Gm. per kilogram of body weight. Infusion of fructose in an amount of 500 ml. of a 20 per cent solution



during a period of 160 minutes caused inhibition of rumen motility. Injection of a 50 per cent fructose solution in a single dose of 1 Gm. per kilogram of body weight produced no apparent effect on rumen motility. The theory that the variations of blood glucose level may effect the ruminal center by way of a humoral mechanism is supported.—[G. Augusto Vallenar: *Effects of the Glycemic Levels on Rumen Motility in the Sheep*. *Am. J. Vet. Res.*, 17, (Jan., 1956): 79-89.]

#### Virulence of Pasteurella Variants for Mice and Chickens

The encapsulated variants of three serological types of *Pasteurella multocida* were highly virulent for mice but only the type 1 encapsulated variant was virulent for chickens. The nonencapsulated colonial dissociant of type one, though only slightly virulent for mice, was more virulent for chickens than the encapsulated variants of the other two serological types. While these results agree with the reports of other investigators that the virulence of this bacterium for mice is associated with the presence of a capsule, they suggest that the virulence factor for chickens is different and may be associated with some other cellular component.—[Katherine E. Yaw, Louise Briefman, and J. C. Kakavas: *A Comparison of Virulence for Mice and Chickens of Different Colonial Variants of the Three Serological Types of Pasteurella Multocida*. *Am. J. Vet. Res.*, 17, (Jan., 1956): 157-159.]

#### Etiology of an Arthritic Disease of Chickens

Recently a new arthritic disease has appeared in the Del-Mar-Va, West Virginia, and Texas broiler-growing areas. It appears to be dissimilar to other arthritic diseases known in the past. The malady appears most frequently in birds 4 to 12 weeks of age and is characterized by lameness and emaciation.

The tendon sheaths, joint bursae, and other synovial structures are inflamed and contain pus. The spleen is enlarged and the liver is frequently discolored with green areas. The joint exudate and tendovaginal fluid as well as liver and spleen tissues have been shown to contain the etiological agent by embryo bird and inoculation. The agent produces pathological changes and mortality when inoculated into the yolk sac of 7-day embryonating eggs, but has not grown on nutrient agar, blood agar, PPLO agar, or carbohydrate mediums. The e.i.d.<sub>50</sub> of the egg-propagated agent may be as high as  $10^{-4}$  and has survived 72 days at  $-15^{\circ}\text{C}$ . in a commercial-type freezer and five hours at  $37^{\circ}\text{C}$ .

The results of filtration experiments (Seitz filters) of egg-propagated material indicate the size of the agent to be approximately  $2.0\mu$  or less. The agent *in vitro* is unaffected by penicillin but is sensitive to streptomycin, terramycin,® achromycin,® and furazolidone.®

The disease is readily transferred from bird to

bird by intramuscular or intravenous inoculations as well as injection into the joint cavity. Joint exudate, liver, or spleen suspensions are capable of reproducing the disease.—[M. S. Cover, H. N. Geleta, and E. F. Waller: *The Etiology of an Arthritic Disease of Chickens*. *Am. J. Vet. Res.*, 17, (Jan., 1956): 12-15.]

#### Newcastle Disease Immunization Studies

The viability of Newcastle disease virus (B1 strain), under simulated field conditions of water administration was adversely affected by high temperatures, chlorination, litter, feed and fecal contamination, fluoridated water, and nonspecific factors (undetermined) in certain waters. Essentially, no effect on viability resulted from hard water, saline water, rust or iron contamination, and wide variations in pH. Animal protein and commercially available stabilizing materials were of definite value in maintaining higher virus titers under adverse conditions. A higher dosage intake of virus during the first four to six hours of administration would avoid many of the subsequent marked decreases in titers.—[R. W. Winterfield and E. H. Seadale: *Newcastle Disease Immunization Studies. I. Viability of Newcastle Disease Virus Administered as a Vaccine in the Drinking Water*. *Am. J. Vet. Res.*, 17, (Jan., 1956): 1-11.]

#### Chemotherapy of Canine Cancer

Studies of normal dogs reveal that hematopoiesis and the "protein stores" are decreased by N-(3-oxapentamethylene)-N', N"-diethylenephosphoramidate (MEPA) as measured by white blood cell and platelet counts, later followed by decreasing hemoglobin values and A/G ratios. The feeding of a casein diet which contained 0.2 Gm. of nitrogen per day per kilogram of body weight and enough MEPA to deliver 5 mg. per day per kilogram of body weight produced leukopenia in 3 normal dogs. Raising the casein nitrogen content to 0.6 Gm. per day per kilogram of body weight or supplementing the lower casein diet with 0.67 per cent methionine and 0.67 per cent glycocamine prevented the development of leukopenia and low A/G ratios in similar dog groups.

An animal cancer clinic accepts patients after biopsy diagnosis. After physical examination and procurement of "base line" samples, patients receive MEPA. Weekly white cell counts govern dosage. Triweekly blood samples are taken for plasma electrophoresis (Tiselius), red blood count, and hemoglobin determinations. Optimum dosages of 0.7 mg. per kilogram of body weight intravenously, or 2 mg. per kilogram of body weight orally, given in single doses for three days, followed by four days withdrawal, permit maximum recovery and resistance of normal tissue to toxic effects. Higher dosages produced marked leukopenia and thrombocytopenia prior to a severe toxicity syndrome. Large amounts of antihistamine,



Ringer's solution, and antibiotics proved successful in saving patients.

Canine cases treated include: fibrosarcoma, 6; mammary carcinoma, 7; malignant lymphoma, 7; squamous cell carcinoma, 2; perianal adenocarcinoma, 1; seminoma, 1; and mast cell sarcoma, 1. Six of 7 malignant lymphoma patients had one or more regressions. Mammary carcinomas underwent changes suggestive of increased cell differentiation. Multiple pulmonary metastases contraindicated the use of MEPA.—[John R. McCoy, J. B. Allison, M. L. Crossley, and R. W. Wannemacher, Jr.: *Chemotherapy of Canine Cancer with N-(3-Oxapentamethylene)-N', N'-Diethylenephosphoramide (MEPA)*. *Am. J. Vet. Res.*, 17, (Jan., 1956): 90-97.]

### Nematocidal Screening Tests for Horse Strongyle Larvae

In a study of the effect of 61 compounds on horse strongyle larvae in feces, it was found that seven of eight organic phosphorus compounds, seven of nine cadmium compounds, two of five nitrofurans, four of 13 heterocyclic compounds, four of 22 other cyclic compounds, and one of three aliphatic compounds killed or prevented the development of the larvae at a concentration of 0.01 M or less. The antibiotic, filipin, was inactive at a concentration of 0.4 per cent. Compounds active at 0.001 M or lower were O,O-dimethylhydroxy-2,2,2-trichlorophosphonate (Bayer L 13/59), 0.0001 to 0.00025 M; O-methyl-0-2,4,5-trichlorophenyl phosphoramidothioate (Dow ET-15), 0.005 to 0.00078 M; cadmium bromide, 0.001 M; cadmium acetate, 0.001 M; and cadmium nitrate, 0.001 M.—[Norman D. Levine, Virginia Ivens, Marlin D. Kleckner, and Jean K. Sonder: *Nematocidal Screening Tests of Organic Phosphorus, Nitrofurans, Cadmium, and Other Compounds Against Horse Strongyle Larvae in Vitro*. *Am. J. Vet. Res.*, 17, (Jan., 1956): 117-120.]

### Test for Safety of Newcastle Disease Vaccines

Strains of Newcastle disease virus used as living vaccines can be divided into two types: (1) lentogenic strains that can be applied with reasonable safety to chicks as young as 1 day of age, and (2) mesogenic strains of somewhat greater pathogenicity that can be given with safety only to chickens 4 to 5 weeks of age or older. Lentogenic strains take longer to kill embryonating eggs, are administered primarily by the respiratory route as vaccines, and presently are represented by BI, LaSota, and F strains. Mesogenic strains kill after a shorter incubation period than the lentogenic type and, as vaccines, are introduced into the skin or muscle tissues. These include Roakin and MK 107 (L) strains.

Lentogenic strains are unable to multiply in the central nervous system of the chicken. Mesogenic strains, while usually unable to traverse the

"blood brain barrier," readily multiply in the brain of chickens if introduced by the intracerebral route. Intracerebral inoculation of virus into day-old chicks is the most sensitive method of distinguishing these two types of Newcastle disease vaccine. An index was devised by giving numerical values to changes observed in 10 chicks over an eight-day period. The indexes obtained ranged from 0 to all chicks surviving without sign of disease, to 20 to all chicks dying within 24 hours. Lentogenic strains have indexes of 0 to 0.2 and mesogenic strains of 0.6 to 1.6. The presence of mesogenic virus in mixtures of the two vaccine types was readily detectable even when the ratio of mesogenic to lentogenic virus was 1:10,000.—[R. P. Hanson: *An Intracerebral Inoculation Test for Determining the Safety of Newcastle Disease Vaccines*. *Am. J. Vet. Res.*, 17, (Jan., 1956): 16-17.]

### BOOKS AND REPORTS

#### Principles of Animal Virology

Sir MacFarlane Burnet has interwoven effectively and interestingly the history of virology with the essential advances in methodology which have given this relatively new science life, substance, and stature. The approach of the experimental biologist prevails in dealing with the diverse phenomena of virus disease at various levels—with the chemical and physical features of the virus particle; the characteristics of virus replication and of the interaction of virus and host cell; the dissemination of infection through the body; of the marshalling of the body's defense and immunity; the factors and means involved in survival of the virus during and after transfer to another host animal. The consideration of the ecological aspects of virus disease emphasizes the impact of environment, both directly as well as with respect to active and passive immunity, in fashioning changes in viruses which favor their survival. Burnet's pioneering in bacteriophage investigations together with his recent concern with variation and recombination (using influenza virus as the model) permit rein of his keen insight and critical scrutiny. Thus, there is provided a logical concept of the evolution of virus disease and a definition of the problems of greatest urgency.

In spite of its basic emphasis on biology, this book will help to clarify and rationalize the thinking of serious students—including the medical and veterinary practitioner—who are daily confronted with the immediate practical problems of controlling virus disease in animals and man. An outstanding contribution to biology, virology, and microbiology, this book should be introduced early to those interested in the experimental biology and to infectious disease as a logical consequence of the host-parasite relationship.—[*Principles of Animal Virology*. By F. M. Burnet, 486 pages. Academic Press, Inc., New York, 1955. Price not given.]—CARL BRANDLY.

# THE NEWS

## Foreign Diseases Subject of Regional Meetings

Foreign animal diseases that are considered potential threats to United States livestock and poultry and their similarity to endemic diseases of the United States will be discussed in detail at a series of six regional two-day meetings to be held in March and April. The Agricultural Research Service, in cooperation with the livestock sanitary officials in the states where the meetings are being held, are sponsors of these meetings, at which time recognized experts on the foreign diseases will present the symptomatology and pathology of these conditions to veterinarians from each state, who it is believed will be the first to come in contact with outbreaks of such exotic diseases.

The schedule for the six regional meetings is as follows:

State	Location	ARS and State Veterinarian in Charge
REGION 1—March 15-17		
Arizona	Phoenix, Ariz.	DR. DONALD MILLER P. O. Box 2439 Phoenix, Ariz.
New Mexico	USO-25 E. Van	
Nevada	Buren St.	DR. JACK A. KING State Veterinarian 217 Capitol Building Phoenix, Ariz.
California		
REGION 2—March 19-21		
Oklahoma	Stillwater, Okla.	DR. D. B. PELLETTE 624 Bankers Service Life Building 114 North Broadway Oklahoma City 2, Okla.
Arkansas	Okla. A.&M. College	
Texas		DR. N. M. REIMENSCHNEIDER State Veterinarian 122 Capitol Building Oklahoma City, Okla.
Louisiana		
Mississippi		
REGION 3—March 22-24		
Montana	Bozeman, Mont.	DR. JOHN L. WILBUR, JR. P. O. Box 245 Helena, Mont.
Idaho	Montana State College	
Oregon		DR. HADLEIGH MARSH State Veterinarian Montana Livestock Sanitary Board Helena, Mont.
Washington		
Wyoming		
Utah		
Colorado		

These regions coincide with a plan developed during recent years by the Agricultural Research Service, in cooperation with a group of collaborators on foreign poultry diseases, designed to establish a regional system of diagnosis of unusual poultry disease conditions. Each meeting will begin at 1:00 p. m. and continue until 12 noon two days later. The state livestock sanitary official and the federal veterinarian in charge of ARS activities in each state are acting as co-hosts for the meetings and are in charge of local arrangements.

Invitations to attend have been extended to practitioners (through the secretaries of all state veterinary medical associations), state and federal livestock sanitary officials, the schools of veterinary medicine, departments of veterinary science or pathology in the land-grant colleges, and certain public health officials in each state, because of the human health significance of several of the diseases to be discussed. Special emphasis is being placed on having at the meeting the veterinarians who have been designated to be in charge of the program for the control of emergency outbreaks of diseases in each state, diagnostic laboratory workers, college clinicians, extension veterinarians, and others who may be called in for consultation with practitioners because of unusual disease occurrences.

It is hoped through this series of meetings to have these key people from each state thoroughly

State	Location	ARS and State Veterinarian in Charge
<b>REGION 4—March 27-29</b>		
Iowa	Ames, Iowa	DR. C. W. BROWN 501 Iowa Building Des Moines 9, Iowa
North Dakota	Iowa State College	
South Dakota		DR. H. U. GARRETT State Veterinarian State House Des Moines 19, Iowa
Nebraska		
Kansas		
Minnesota		
Missouri	Wisconsin	
Illinois	Michigan	
Indiana	Ohio	
<b>REGION 5—April 9-11</b>		
Georgia	Athens, Ga.	DR. CHESTER J. MIKEL 614 Atlanta National Bldg. 50 Whitehall St., S.W. Atlanta 3, Ga.
Florida	University of Georgia	
Alabama		DR. J. W. MANN Chief Veterinarian State Capitol Atlanta 3, Ga.
South Carolina		
North Carolina		
Tennessee		
Kentucky		
West Virginia		
Virginia		
<b>REGION 6—April 17-19</b>		
Connecticut	Storrs, Conn.	DR. ROBERT L. ALKIRE 207 State Office Building Hartford, Connecticut
Maine	University of Connecticut	
New Hampshire		DR. J. V. SMITH State Veterinarian State Office Building Hartford, Conn.
Vermont		
Massachusetts		
Rhode Island		
New York		
New Jersey		
Pennsylvania		
Maryland	Delaware	

familiar with the foreign diseases that are considered most likely to gain entrance into the United States, as well as to inform them as to what organization has been planned for coping with these emergency outbreaks of foreign diseases.

Inquiries relative to room reservations and meals should be directed to state livestock sanitary officials or the federal veterinarian in charge of ARS activities in the states where the meetings are being held.

### Equine Practitioners Association Holds Annual Meeting

The American Association of Equine Practitioners held its second annual meeting in Chicago on Dec. 16-17, 1955. Over 60 members and other veterinarians interested in equine medicine, especially race horse practice, from throughout the United States and Canada, were in attendance.

The first day's program was held at the La Salle Hotel and included an address by the president, Dr. M. L. Scott, Akron, Ohio, and reports of officers and committees, plus the following papers: E. A. Churchill, Centerville, Md. (Removal of Fractured Fragments of the Proximal Sesamoid Bones); J. F. Herrick, Mayo Clinic, Rochester, Minn. (Uses, Limitations, and Dangers of Ultrasonic Therapy); a panel discussion on respiratory diseases led by T. E. Dankin, Chicago, and a panel discussion on Association problems led by M. L. Scott.

The second day's program was presented at Rolling Acres Equine Hospital and included talks by Neal D. Lusk, Chicago (Treatment of Equine Digestive Disturbances); Paul J. Meginnis, Chicago (Nasal Irrigations for Sinusitis); H. N. Davis, Lexington, Ky. (Some Common Diseases of the Newborn Foal); Col. John H. Rust, University of Chicago (Radiation Therapy, Facts and Fantasy), and Robert Getty, Iowa State College (Local Anesthesia and Nerve Blocks).

Dr. Herrick presented fundamental concepts of ultra-sound and pointed out the dangers of indiscriminate ultrasonic therapy, showing how the misuse of this agent can lead to extensive tissue damage, including bone degeneration; this type of therapy can be useful, however, if it is expertly given and controlled.

Colonel Rust described the basic facts of radiation and emphasized the limitations of its use and the hazards to the patient as well as the veterinarian.

The entire technical program was excellent and stimulated much discussion. There was also discussion of how A.A.E.P. could best proceed with its program and stated objectives (see the JOURNAL, Sept., 1955: 276) and a number of suggestions were made as to how graduate training in equine medicine and surgery might be arranged for young veterinarians interested in this specialized field, also short courses and other postgraduate training for veterinarians already engaged in equine practice. The Association also hopes to stimulate more interest in, and support of, research on equine disease problems.

One of the most serious and vexing problems confronting A.A.E.P. and its members is the relationship between veterinarians engaged in race horse practice and the racing commissions. The Association's officers will endeavor

to draft a suggested code or set of regulations governing these relationships for submission to members and eventual adoption. This area is admittedly difficult to define and agree upon but it is hoped that an acceptable solution will be worked out in time.

At the conclusion of the meeting, Dr. W. F. Guard, Ohio State University, was installed as president of A.A.E.P. for the ensuing year and Dr. T. E. Dunkin, Chicago, as secretary-treasurer, succeeding Dr. J. B. Solomon, Cleveland. The new president-elect is Dr. Horace N. Davis, Lexington, Ky. Dr. Solomon is the secretary-treasurer-elect.

A number of new members were admitted and several membership applications were received during the meeting. The AVMA was officially represented by President Floyd Cross, President-Elect Wayne O. Kester, Executive Board members J. M. Arburua, W. G. Brock, and F. B. Young, and executive-secretary J. G. Hardenbergh.

### Dr. Monlux, AVMA Research Fellow, Completes Survey on Animal Neoplasia

Dr. Andrew W. Monlux (ISC '42) who, with the aid of an AVMA Research Fellowship, completed his Ph.D. in comparative pathology at George Washington University and the Armed Forces Institute of Pathology in 1951, is the senior author of an article on neoplastic diseases of cattle in the January, 1956, *American Journal of Veterinary Research* (see abstract, J.A.V.M.A., Feb. 1, 1956: 160). The article, "Adenocarcinoma of the Uterus of the Cow; Differentiation of Its Pulmonary Metastases from Primary Lung Tumors," is the second in a series based on re-



Dr. Andrew W. Monlux

search conducted on neoplastic diseases of food-producing animals at the Animal Disease Research Laboratory, Agricultural Research Service, U.S.-D.A., Denver, Colo. The first paper, entitled "Multiple Schwannomas of Cattle (Nerve Sheath Tumors; Multiple Neurilemmomas; Neurofibromatosis)" was published in 1953 (*Am. J. Vet. Res.*, 14, 1953:499).

Articles on a two-year survey of tumors occurring in cattle, sheep, and swine slaughtered at Denver's federally inspected abattoirs are being prepared for publication by Dr. Monlux and his collaborators. These investigations will supply needed information on the relative occurrence of different types of tumors in slaughtered food-producing animals and is a project actively supported by members of the National Cancer Advisory Committee.

Following the completion of his graduate work, Dr. Monlux accepted a position as veterinarian with the Agricultural Research Service, U.S.D.A., at Washington, D.C., and was later transferred to the Animal Disease Research Laboratory at Denver. In addition to research in the field of animal neoplasia, he and his colleagues have reported studies entitled "Leptospirosis in Hogs" (*North Am. Vet.*, 33, 1952:467) and "Report on Investigations of Icterus in Swine" (*North Am. Vet.*, 34, 1953:257).

Much of Dr. Monlux's Ph.D. thesis was included in articles which appeared in the *American Journal of Veterinary Research* (July, 1953: 425-447) entitled "The Histopathology of Nephritis of the Dog. I. Introduction. II. Inflammatory Interstitial Diseases. III. Inflammatory Vascular Diseases of the Kidney."

From 1952 to 1955, Dr. Monlux was a member of the AVMA Committee on the Registry of Veterinary Pathology, Armed Forces Institute of Pathology. He served as chairman the first two years.

## AMONG THE STATES AND PROVINCES

### Colorado

**Annual Conference for Veterinarians.**—The annual conference for Colorado veterinarians will be held Feb. 20-22, 1956, at the School of Veterinary Medicine, Colorado A. & M. College in Fort Collins.

The following out-of-state speakers will address the group: G. T. Easley, Sulphur, Okla. (Sterility of Beef Cattle, and Beef Cattle Practice Problems); Wm. Irwin, Tulsa, Okla. (Fractures in Dogs, and Correcting Faulty Ear Carriage); L. H. Easterbrooks, Lederle Laboratories, Pearl River, N. Y. (Vibriosis of Cattle, and Mastitis of Cattle); R. W. Ormsbee, Stockton, Calif. (Preventive Medicine in Dairy Cattle, and Sterility of Dairy Cattle); Dr. George Burch, Pitman-Moore Co., Indianapolis, Ind., will also present a paper.

Members of the staff of the School of Veterinary Medicine and practitioners of Colorado will discuss Artificially Induced Abortions in Feeder Cattle, Rhinotracheitis of Cattle, Dwarfism of Cattle, Effects of X Rays on Veterinarians, Sheep Diseases, Fesque Foot of Cattle, New Developments in Swine Practice, Surgery in Small Animals, Chinchilla Diseases, Infectious Feline Anemia, Laboratory Aids in Small Animal Practice, and Corneal Diseases of Dogs.

s/O. R. ADAMS, *Secretary*.

### Illinois

#### University Has New Large Animal Clinic.

A new large animal clinic at the University of Illinois College of Veterinary Medicine has been in full operation since the end of October, 1955. It is a brick and concrete structure, 250 by 78 feet, and will accommodate 50 large animals. It includes the surgery unit with ad-



The new large animal clinic at the College of Veterinary Medicine, University of Illinois, is 250 by 78 feet and will accommodate 50 large animal patients.

joining rooms for pharmacy, x ray, tack room, and recovery room, with a fenced-in service court at the rear. The college hopes to add a wing to accommodate a small animal clinic in the future. In the meantime, the small animal clinic services and departmental offices will remain in the old veterinary clinic building.

• • •  
**State Association.**—The seventy-fourth annual meeting of the Illinois Veterinary Medical Association will be held at the LaSalle Hotel in Chicago, Feb. 20-22, 1956.

Among the out-of-state speakers who will appear on the program are: Floyd Cross, Colorado A. & M. College, Fort Collins, president of the AVMA (Diseases of Sheep in Feedlots); R. E. Piersen, Colorado A. & M. College, Fort Collins (Infectious Rhinotracheitis in Feedlot Cattle); N. L. McBride, Pasadena, Calif. (Clinical and Histopathological Considerations in Otitis Therapy); R. G. Schirmer, Michigan State University, East Lansing (Evaluating Restraint and Newer Treatments); and B. W. Kingrey, Iowa State College, Ames (Lameness in Cattle).

Practitioners from neighboring states will appear on the program in panel and symposium discussions. Radio station W.L.S. will broadcast the Dinnerbell program, conducted by Maynard Bertsch, from the convention floor on Tuesday, February 21.

s/C. B. HOSTETLER, *Secretary.*

#### Minnesota

**Veterinary School Participates in Meeting of Extension Agents.**—On the afternoon of Dec. 8, 1955, the School of Veterinary Medicine, University of Minnesota, participated in the annual extension conference for Minnesota extension agents.

Dean Thorp spoke to the county agricultural extension agents on "The School of Veterinary Medicine and Minnesota Animal Industry." He also introduced the division heads of the University of Minnesota School of Veterinary Medicine. Following this, the group toured the School of Veterinary Medicine and viewed demonstrations of research in progress.

s/A. F. WEBER, *Professor,*  
*Division of Veterinary Anatomy.*

#### Missouri

**State Association.**—The sixty-fourth annual meeting of the Missouri Veterinary Medical Association will be held February 20-21 at the Continental Hotel in Kansas City, Mo.

Presentations by out-of-state speakers will include: John D. Wheat, Davis, Calif. (Hereditary and Congenital Conditions Encountered in Practice; and Surgical Techniques in Large Animal Practice); William L. Sippel, Tifton, Ga. (Swine Leptospirosis; and Laboratory Aids for the Practitioner); David E. Bartlett, Chicago (Infertility in Bulls); Lee Seghetti, Colorado A. & M. College, Fort Collins (In-

fectious Bovine Rhinotracheitis; and Fescue Lameness in Cattle); H. E. Jensen, University Heights, Ohio (Ear Trimming; and Eye Surgery); Richard L. Ott, Washington State College, Pullman (Canine Virus Disorders; and Diagnostic Procedures in Small Animal Practice); Kenneth Whittington, Memphis, Tenn. (Small Animal Parasites and their Treatment; and Nonparasitic Canine Dermatoses); Hugh D. Simpson, Iowa State College, Ames (Use of Plastic Lens in Canine Eye Surgery); F. B. Young, Waukegan, Iowa (Meeting the Impact of Lay Marketing on Veterinary Practice); Brig. General Wayne O. Kester, president-elect of the AVMA (Background for Progress); and C. D. Van Houweling, Washington, D. C. (National Brucellosis Program and Related ARS Activities). One of the highlights of the program will be a panel discussion of guest speakers and local practitioners on feline diseases.

s/PAUL L. SPENCER, *Secretary.*

#### Pennsylvania

**Dr. Guss in Charge of New Veterinary Section at State University.**—With Dr. Samuel B. Guss (UP '43) in charge, the Agricultural Extension Service of the Pennsylvania State University, University Park, has set up a new section in veterinary science. This added educational service in the University's extension program will help meet an urgent need throughout the state, especially on dairy and livestock farms. Dr. Guss will work in an educational capacity throughout the state. He will have the academic title of associate professor of veterinary science extension.



Dr. Samuel B. Guss

Prior to joining the Penn State staff, Dr. Guss had been on the staff of the Lynchburg, Va., veterinary hospital.



## West Virginia

**State Association.**—The annual winter meeting of the West Virginia Veterinary Medical Association will be held February 19-20 at the Greenbriar Hotel in White Sulphur Springs.

The following out-of-state speakers will present papers at the scientific session: Dean Walter R. Krill of the Ohio State University, Columbus; James R. Hays, ARS, Ohio; A. H. Frank, ARS, Beltsville, Md.; James H. Mark, University of Pennsylvania, Philadelphia; William P. Johnson, Lederle Laboratories, Pearl River, N. Y.; and E. N. Moore, Athens, Ohio.

s/D. A. MUNRO, *Resident Secretary.*

## DEATHS

★**Ashe Lockhart** (KCV '15), 65, former president and general manager of Ashe Lockhart, Inc., manufacturers of biological products, died on Jan. 11, 1956, at his home, 610 West 57th St. Terrace, Kansas City, Mo. One of the best



Dr. Ashe Lockhart

known and most highly respected men in the veterinary profession, he had been in failing health in recent years.

Born in Wadesboro, N. Car., in 1891, Dr. Lockhart received his B.S. degree from Virginia Polytechnic Institute, Blacksburg, and then entered Kansas City Veterinary College, graduating in 1915. After serving on the faculty, he became associated with the late Dr. A. T. Kinsley of Kinsley Laboratories. He established his own firm in 1927; it was sold last year to Cutter Laboratories and Dr. Lockhart retired at about the same time.

He made many contributions to veterinary science and was especially interested and successful in developing and improving a number of biological products, including a canine distemper vaccine on which Laidlaw and Dunkin later based some of their well-known work.

An active member and loyal supporter of vet-

erinary medical associations, local, state, and national, Dr. Lockhart served his profession in many ways; he was a member of the AVMA Executive Board (District VIII) in 1935-1936 and later was elected for a five-year term, 1941-1946. He also served on the committee on veterinary biological products. He was a member of the Society of American Bacteriologists and an associate member of the Jackson County Medical Association.

Dr. Lockhart is survived by his widow, the former Marguerite Mayo, daughter of Dr. N. S. Mayo; a sister and a brother, both of North Carolina. Funeral services were held on January 13.

★**Harry W. Orr** (ISC '18), 59, dean of the school of veterinary medicine, Oklahoma A. & M. College, Stillwater, died suddenly on Jan. 14, 1956.

Born at Mystic, Iowa, Aug. 9, 1896, Dr. Orr received his secondary education at Mason City and his veterinary degree at Iowa State College. He later received an M.S. degree at the same school. After serving as a second lieutenant in the Veterinary Corps in World War I and about a year in practice in Iowa, he was appointed to the staff of Oklahoma A. & M. College as assistant professor in the Department of Bacteriology, Physiology, and Veterinary Science. He was promoted to associate



Dr. Harry W. Orr

professor of physiology in 1923, professor in 1927, head of the Department of Veterinary Physiology and Pharmacology in the new school in 1948, and dean of the school in 1953.

Dr. Orr joined the AVMA in 1918 and was a member of a number of other associations and fraternities including the A.A.A.S., the New York Academy of Sciences, National Education Association, Phi Kappa Phi, and the Masons.

He is survived by his widow, the former Ruth Duncan Sundell, a son, daughter, and three grandchildren. Funeral services were held in the First Presbyterian Church in Stillwater on January 16.

★Indicates members of the AVMA.



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## ORGANIZATION SECTION

### The AVMA Research Fund

During the period of Aug. 1, 1955, through Nov. 30, 1955, 875 veterinarians contributed a total of \$10,067 to the AVMA Research Fund (see geographic summary, table 1).

These funds were received in response to two letters mailed in August and October marking the beginning of "annual giving" to the fund. ANNUAL GIVING is believed to be a much better method of obtaining steady, continued support of the AVMA Research Fellowship Program than the previous sporadic campaigns conducted every few years.

One hundred and fifty-one (151) contributors also pledged to give a total of \$1,993 annually for the fund as evidence of their belief in an-

nual giving. It is hoped that the number of veterinarians sharing this attitude will increase with succeeding annual fund-raising efforts.

Contributed funds are used to award fellowships to carefully selected young veterinarians with an aptitude for research to carry on specific projects at approved educational institutions.

Each fellowship carries a monthly stipend which defrays the veterinarian's expenses while he is working on the project. Fellows are encouraged to obtain advanced college degrees while engaged in this investigational work, so that they will be qualified to make a career of research and teaching.

Complete information about the AVMA Research program and a brief description of the work done thus far by the research fellows who have studied under the program is given in the booklet "Research—the Key to Veterinary Progress." Copies may be obtained by writing to the AVMA office in Chicago.

TABLE 1—Geographic Summary—Contributions from Individual Veterinarians to AVMA Research Fund for Period of Aug. 1, 1955, Through Nov. 30, 1955

State	No. of Contributors	Amount
Alabama	11	\$ 195.00
Arizona	3	55.00
Arkansas	4	35.00
California	73	850.00
Colorado	9	135.00
Connecticut	12	145.00
Delaware	2	25.00
Dist. of Columbia	4	45.00
Florida	8	175.00
Georgia	13	135.50
Idaho	4	32.00
Illinois	64	1,046.00
Indiana	28	330.00
Iowa	54	554.50
Kansas	19	180.50
Kentucky	3	60.00
Louisiana	4	120.00
Maine	9	75.00
Maryland	19	205.00
Massachusetts	17	206.00
Michigan	34	290.00
Minnesota	25	208.00
Mississippi	6	45.00
Missouri	22	167.00
Montana	6	40.00
Nebraska	12	107.50
Nevada	2	15.00
New Hampshire	4	32.00
New Jersey	20	215.00
New Mexico	2	20.00
New York	69	1,154.00
North Carolina	13	155.00
North Dakota	6	70.00
Ohio	71	622.50
Oklahoma	4	50.00
Oregon	13	151.00
Pennsylvania	43	489.00
Rhode Island	3	60.00
South Carolina	1	5.00
South Dakota	5	60.00
Tennessee	8	90.00
Texas	24	215.00
Utah	3	50.00
Vermont	3	20.00
Virginia	22	230.00
Washington	17	138.00
West Virginia	5	35.00
Wisconsin	33	495.50
Wyoming	2	20.00
Canada	16	210.00
U. S. Possessions	1	5.00
Totals	857	\$10,067.00

### WOMEN'S AUXILIARY

President—Mrs. Earl N. Moore, 636 Beall Ave., Wooster, Ohio.

Secretary—Mrs. F. R. Booth, 3920 E. Jackson Blvd., Elkhart, Ind.

**The Women's Auxiliary and the Research Fund.**—One of the most gratifying and worthwhile projects of the Women's Auxiliary of the AVMA is sponsoring a campaign to help raise funds for the AVMA Research Fund. This fund was established by the AVMA in 1942 and is administered by the Research Council. Its purpose is to grant fellowships and to render financial aid to young veterinarians who are interested in obtaining advanced degrees for a career in research or teaching.

In 1952, a fund-raising drive was instigated, to which \$45,910.58 has been contributed. Of this amount, 36 women's auxiliaries have donated \$1,567. Last year, \$843.50, a scant half-fellowship, was contributed by 25 auxiliaries.

To date, 30 fellowships have been awarded. The fellows have worked at various institutions in North America and one in Europe. Their records speak well for the graduates who have completed advanced training under the AVMA fellowship program, for they are contributing regularly to advances in the veterinary field.

The Research Council considered 15 young veterinarians last April for fellowships, made five awards, selected two alternates, and contributed financial support to three who held grants the previous year.

The Council was pleased with the increased number of applicants. To create further interest, the Council is making plans to familiarize the AVMA student chapters with the re-

(Continued on p. 22)



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## ORGANIZATION SECTION

### Academic Costume for Graduating Veterinary Students

The House of Representatives, at the Minneapolis AVMA annual meeting, Aug. 15-18,



Academic Costume for Veterinary Students

1955, approved a recommendation of the Executive Board and the Council on Education that the academic costume for students graduating in veterinary medicine consist of a full-length black gown with full-length sleeves, and with steel gray panel trimming and three gray arm bars of velvet.

The cap is to be black with a gray tassel and the hood of usual size and shape worn by the professions—black with the appropriate school colors superimposed and trimmed in steel gray.

WASHINGTON NEWS — Continued from adv. p. 12

in rural areas where there is not the urge to relocate for retirement as exists in large metropolitan areas.

In view of the existing retirement habits of veterinarians, it would be an injustice to saddle them with contributions with little likelihood of desiring or requiring the benefits for which they would be required to pay. It would be an enforced insurance that does not fit the economic pattern of the self-employed veterinarian. Furthermore, the tax burden imposed would be considerable over the years. For example, a self-employed person, age 35, paying social security taxes for 30 years, 1956 to 1985, would contribute \$6,111.00. Under the rates proposed in



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H.R. 7225, his taxes would amount to \$7,096.00. The amount paid would be increased providing his earnings exceeded \$1,200 per taxable year; furthermore, he would not receive any retirement benefit until age 72.

Gentlemen, it does not seem right to compel those who are capable of providing for their own security to come under the Social Security System. We believe the self-employed veterinarian should be allowed some degree of self-determination with respect to coverage under the Act. The American way would be to permit voluntary coverage. We have heard there are some in government who say this is not feasible. It is a fact, however, voluntary coverage is permitted for some. The American Veterinary Medical Association is on record in favor of voluntary coverage for the self-employed veterinarian.

H.R. 7225 does not provide for universal compulsory coverage, certain employed and self-employed being excluded. We submit that the self-employed veterinarians likewise are a proper group for exclusion.

The American Veterinary Medical Association respectfully requests that H.R. 7225 be amended to exclude the self-employed veterinarians from compulsory coverage under the Old Age Survivors Insurance System.

We thank you for the privilege of testifying.



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## ORGANIZATION SECTION

**WOMEN'S AUXILIARY**—Continued from adv. p. 18  
search program. As the interest grows, so must the Research Fund.

As wives of veterinarians, we are all proud of, and interested in advancing, the science and art of veterinary medicine. We want our husband's chosen profession to progress. For progress there must be research, for research there must be desire, and to fulfill that desire there must be funds. As individuals we can incite young veterinarians to work for advanced degrees in veterinary research and teaching. We can also acquaint our husbands and others with the Research Council and its "annual giving" campaign, and urge them to give generously to it. As members of a women's auxiliary, we can urge our auxiliaries to donate to the fund and to sponsor special Research Fund-raising activities.

By donating to the Research Fund, your auxiliary can meet one of the five points for the national "honor roll," the public can meet your members and through them become aware of one of the many worthwhile projects of your auxiliary and related veterinary organizations.

Recently, several groups have raised their dues to meet rising expenses and to enable them to make donations to the research and other funds. One auxiliary has even earmarked

\$1.00 of each member's \$2.00 annual dues for the research fund! Another sponsored a rummage sale, still another a white elephant sale. Some organizations have published cook books and one holds a successful hobby show and sale annually. Bazaars and bake sales are also rewarding.

We know you are interested in promoting the veterinary profession, we know women are wizards when it comes to raising funds, so let's put that ingenuity to work and donate a fellowship in '56!

S/(Mrs. E. E.) FRED A. LEASURE, *Recorder*.

## STUDENT CHAPTER ACTIVITIES

**Ohio Chapter.**—At the Nov. 30, 1955, meeting of the University of Ohio Student Chapter of the AVMA, Dr. J. H. Knapp, of Columbus, spoke on the management of a small animal hospital. Dr. R. W. Vesper, Columbus, addressed the group on December 8 on the duties of a zoo veterinarian.

Junior and senior students attended the annual convention of the Ohio State Veterinary Medical Association in Columbus, Jan. 4-6, 1956.

S/LOWELL E. RIPLEY, *Secretary*.

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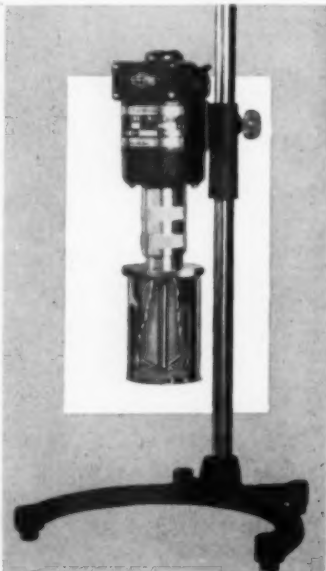
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## COMING MEETINGS

West Virginia Veterinary Medical Association. Winter meeting. Greenbrier Hotel, White Sulphur Springs, W. Va., Feb. 19-20, 1956. D. A. Munro, West Virginia University, Morgantown, W. Va., secretary.

Missouri Veterinary Medical Association. Annual meeting. Kansas City, Mo., Feb. 20-21, 1956. Paul L. Spencer, P.O. Box 283, Jefferson City, Mo., secretary.

Illinois State Veterinary Medical Association. Annual meeting. Hotel LaSalle, Chicago, Ill., Feb. 20-22, 1956. C. B. Hostetler, 1385 Whitcomb Ave., Des Plaines, Ill., secretary.

Colorado A. & M. College. Conference for veterinarians. Glover Veterinary Hospital, School of Veterinary Medicine, Colorado A. & M. College, Fort Collins, Colo., Feb. 20-22, 1956. O. R. Adams, Department of Veterinary Clinics and Surgery.

Missouri Veterinary Medical Association. Annual meeting. Hotel Continental, Kansas City, Mo., Feb. 20-21, 1956. Paul L. Spencer, P.O. Box 283, Jefferson City, Mo., secretary.

Alabama Veterinary Medical Association. Annual meeting. Whitley Hotel, Montgomery, Ala., March 18-20, 1956. M. K. Heath, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, Ala., secretary.

Washington, State College of. Annual conference for veterinarians. College of Veterinary Medicine, State College of Washington, Pullman, Wash., April 2-4, 1956. John R. Gorham, conference chairman.

American Animal Hospital Association. Annual meeting. Hotel Fontainebleu, Miami Beach, Fla., May 23-26, 1956. W. H. Riser, 5335 Touhy Ave., Skokie, Ill., executive secretary.

Maryland State Veterinary Medical Association. Annual summer meeting. George Washington Hotel, Ocean City,

Md., June 28-29, 1956. John D. Gadd, Cockeysville, Md., secretary.

South Carolina Association of Veterinarians. Summer meeting. Clemson House, Clemson College, S. Car., June 28-30, 1956. Worth Lanier, York, S. Car., secretary.

Alabama Polytechnic Institute. Annual conference for veterinarians. School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, Ala., July 22-25, 1956. R. S. Sugg, dean.

Pennsylvania State Veterinary Medical Association. Annual meeting. Bedford Springs Hotel, Bedford, Pa., Sept. 12-14, 1956. Raymond C. Snyder, N.W. Corner Walnut St., and Copley Rd., Upper Darby, Pa., secretary.

American Veterinary Medical Association. Annual meeting. Municipal Auditorium, San Antonio, Texas, Oct. 15-18, 1956. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

### Foreign Meetings

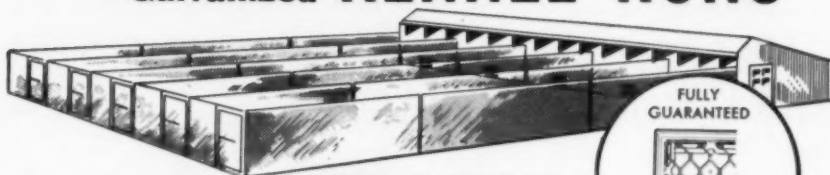
World Congress on Fertility and Sterility. Naples, Italy, May 18-26, 1956. Professor T. Bonadonna, Via Monte Ortigara, 35, Milan, Italy, in charge of Veterinary Section.

Tenth International Congress of Entomology. McGill University and University of Montreal, Montreal, Canada, Aug. 17-25, 1956. J. A. Downes, Division of Entomology, Science Service Bldg., Ottawa, Ont., Canada, secretary.

International Association of Hydatidology. Sixth Congress. Athens, Greece, Sept. 14-18, 1956. Prof. B. Kourias, 1 MacKenzie King St., Athens, Greece, general secretary.

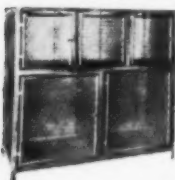
(Continued on p. 26)

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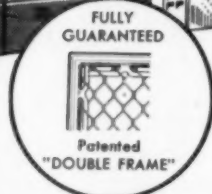
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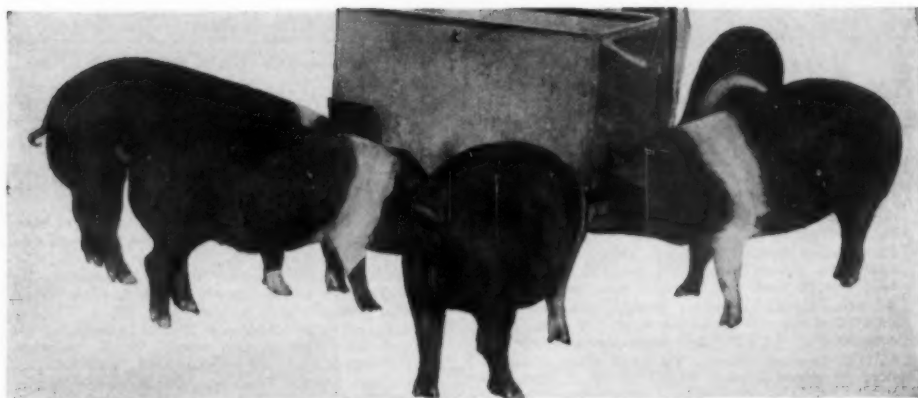
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### Regularly Scheduled Meetings

**ALABAMA**—Central Alabama Veterinary Association, the first Thursday of each month. G. J. Phelps, Jr., Montgomery, Ala., secretary.

Jefferson County Veterinary Medical Association, the second Thursday of each month. W. R. Laster, Jr., 215 N. 15th St., Birmingham, Ala., secretary.

**ARIZONA**—Central Arizona Veterinary Medical Association, the second Tuesday of each month. Keith T. Maddy, Phoenix, Ariz., secretary.

Pima County Veterinary Medical Association, the third Wednesday of each month in Tucson. E. T. Anderson, 8420 Tanque Verde Rd., Tucson, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. E. T. Anderson, Rt. 2, Box 697, Tucson, Ariz., secretary.

**CALIFORNIA**—Bay Counties Veterinary Medical Association, the second Tuesday of each month. E. Paul, Redwood City, Calif., secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Wilfred Pimentel, 3455 S. Elm Ave., Fresno, Calif., secretary.

East Bay Veterinary Medical Association, bimonthly, the fourth Wednesday. John T. Turver, 1201 E. 12th St., Oakland 6, Calif., secretary.

Kern County Veterinary Medical Association, the first Thursday evening of each month. B. C. Watson, 825 14th St., Bakersfield, Calif., secretary.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. W. H. Rocky, P. O. Box 121, San Luis Obispo, Calif., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campbell, 90 Corral de Tierra, Salinas, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Co-

vell, in Modesto, Calif. Lyle A. Baker, Turlock, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month at 8:00 p.m. in Antlers Hotel, San Bernardino, Calif. Jay C. Wallis, 112 N. Girard St., Hemet, Calif., secretary.

Orange County Veterinary Medical Association, the third Thursday of each month. Donald E. Lind, 2643 N. Main St., Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. T. D. Harris, San Mateo, Calif., secretary.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. Robert E. Clark, Napa, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. W. E. Steinmetz, 4227 Freeport Blvd., Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. H. R. Rossoll, 1795 Moore St., San Diego, Calif., secretary.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at Eaton's Restaurant in Studio City, Calif. R. A. Burton, 5954 Van Nuys Blvd., Van Nuys, Calif., secretary.

Southern California Veterinary Medical Association, the third Wednesday of each month. Howard C. Taylor, 2811 West Olive St., Burbank, Calif., secretary.

Tulare County Veterinarians, the second Thursday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

**COLORADO**—Denver Area Veterinary Society, the fourth Tuesday of every month. Richard C. Tolley, 5060 S. Broadway St., Englewood, Colo., secretary.

Northern Colorado Veterinary Medical Society, the first Monday of each month. M. A. Hammarlund, School of

(Continued on p. 28)

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Veterinary Medicine, Colorado A. & M. College, Fort Collins, Colo., secretary.

**DELAWARE**—New Castle County Veterinary Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. E. J. Hathaway, Clifton Park Manor, Apt. 73-5, Wilmington 2, Del., secretary.

**FLORIDA**—Jacksonville Veterinary Medical Association, the second Thursday of each month, time and place specified monthly. L. D. Barrett, Rt. 8, Box 572, Jacksonville, Fla., secretary.

Palm Beach Veterinary Society, the last Thursday of each month in the county office building at 810 Datura St., West Palm Beach, Ross E. Evans, 5215 S. Dixie Highway, West Palm Beach, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. Paul J. Myers, Winter Haven, Fla., secretary.

South Florida Veterinary Society, the third Tuesday of each month, at the Seven Seas Restaurant, Miami, Fla. E. D. Stoddard, 6432 S. W. 8th St., Miami, Fla., secretary.

**GEORGIA**—Atlanta Veterinary Society, the second Tuesday of every month at the Elks Home on Peachtree St., Atlanta, Ga. J. L. Christopher, Smyrna, Ga., secretary.

**ILLINOIS**—Chicago Veterinary Medical Association, the second Tuesday of each month, Mark E. Davenport, Jr., 215 S. Edgewood Ave., LaGrange, Ill., secretary.

Eastern Illinois Veterinary Medical Association, the first Thursday of March, June, September, and December. A one-day clinic is held in May. R. P. Link, College of Veterinary Medicine, University of Illinois, Urbana, Ill., secretary.

**INDIANA**—Central Indiana Veterinary Medical Association, the second Wednesday of each month, Charles J. York, P. O. Box 1656, Indianapolis 6, Ind., secretary.

Michiana Veterinary Medical Association, the second Thursday of each month, at the Hotel LaSalle, South

Bend, Ind. L. D. Ramsay, 719 E. Jefferson Ave., La Porte, Ind., secretary.

Tenth District Veterinary Medical Association the third Thursday of each month. W. E. Sharp, Union City, Ind., secretary.

**IOWA**—Cedar Valley Veterinary Association, the second Monday of each month, except January, July, August, and October, at Black's Tea Room, Waterloo, Iowa. D. A. Buchanan, Grundy Center, Iowa, secretary.

Coon Valley Veterinary Association, the second Wednesday of each month, September through May, at the Bradford Hotel, Storm Lake, Iowa. D. I. Lee, Sac City, Iowa, secretary.

Fayette County Veterinary Association, the third Tuesday of each month, except in July and August, at Pa and Ma's Restaurant, West Union, Iowa. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

**KENTUCKY**—Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month in Louisville or within a radius of 50 miles. Dr. W. E. Bewley, P. O. Box "H", Crestwood, Ky., secretary.

**MARYLAND**—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m. at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Harry L. Schultz, Jr., 9011 Harford Rd., Baltimore, Md., secretary.

**MICHIGAN**—Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert E. Kader, 5034 Armstrong Rd., Lansing 17, Mich., secretary.

(Continued on p. 30)

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## small animal therapy note

new! Jen-Sal's Cycloderm in a  
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New lotion formula of Jen-Sal's already outstanding external fungicide attacks fungi effectively by deep and rapid penetration of hair follicles. Odorless, non-staining, non-irritating Cycloderm Lotion can be dispensed for dry eczemas or ringworm to the complete satisfaction of you and your clients. Packaged in cartons of six—one oz. plastic squeeze bottles with slip-off labels.



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OF JOINTS AND ACCESSORY TISSUES,  
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Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. S. Correll, Rt. 1, Midland, Mich., secretary.

Southeastern Veterinary Medical Association, the fourth Wednesday of every month, September through May. Gilbert Meyer, 14093 E. Seven Mile Rd., Detroit 5, Mich., secretary.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of the month (except July and August) at the Sheraton Hotel, Spring Ave. and Lindell Blvd. Allen B. Shopmaker, 136 N. Meramec, Clayton 5, Mo., secretary.

Kansas City Small Animal Hospital Association, the first Monday of each month, at alternating hospitals. W. F. Noland, 7504 Metcalf, Overland Park, Kan., secretary.

Kansas City Veterinary Medical Association, the third Tuesday of each month at Exchange Hall, ninth floor, Livestock Exchange Bldg., 1600 Genessee St., Kansas City, Mo. Busch Meredith, 800 Woodsworth Rd., Kansas City 5, Mo., secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April at the Academy of Medicine, 91 Lincoln Park South, Newark, N. J. Myron S. Artein, 2172 Milburn Ave., Maplewood, N. J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Casa Mana in Teaneck, N. J. Edward Baker, 568 Grand Ave., Englewood, N. J., secretary.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel in Greensboro, N. Car. R. T. Copeland, 1800 Walker Ave., Greensboro, N. Car., secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month. John D. Baker, Goldsboro, N. Car., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month at 7:00 p.m. in Mull's Motel in Hickory, N. Car. W. W. Dickson, Box 1071, Gastonia, N. Car., secretary.

OHIO—Cuyahoga County Veterinary Medical Association, the first Wednesday of each month, September through May (except January), at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. Ed. R. Jacobs, 5522 Pearl Rd., Cleveland, Ohio, secretary.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month except July and August. James M. Brown, 2818 W. Britton Rd., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month in Directors' Parlor of the Brookside State Bank, Tulsa, Okla. Merle S. Watts, 5302 E. 11th St., Tulsa, Okla., secretary.

PENNSYLVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine, 39th and Woodland Ave., Philadelphia 4, Pa. Raymond C. Snyder, 39th and Woodland Ave., Philadelphia 4, Pa., secretary.

SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fair-

(Continued on p. 32)

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To maintain unrestricted milk flow and provide antiseptic protection is of first importance in the care of injured teats, Scab teats, Stenosis, and in post operative therapy. Dr. Naylor Medicated Teat Dilators are SULFA-impregnated surgical dressings for the teat canal.

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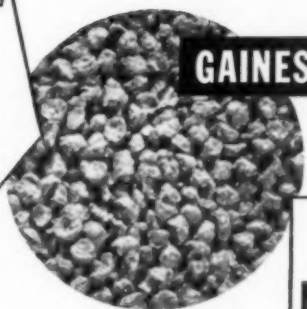


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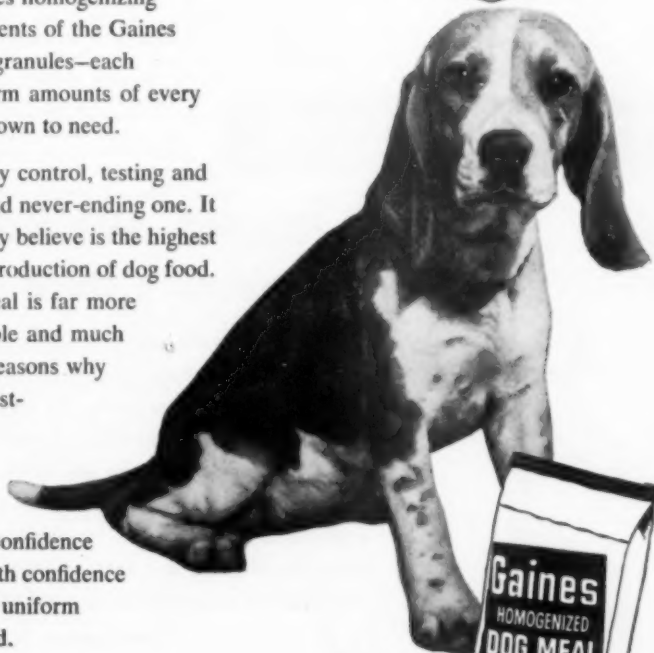
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TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month, J. Marvin Prewitt, 4141 Lexington Blvd., Corpus Christi, Texas, secretary.

VIRGINIA—Central Virginia Veterinarians' Association, the third Thursday of each month at the William Byrd Hotel in Richmond at 8:00 p.m. M. R. Levy, 312 W. Cary St., Richmond 20, Va., secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Tuesday of each month in the Trinity Episcopal Church, 8th and James St., Seattle, Wash. P. R. Des Rosiers, 5506 2nd Ave., N. W., Seattle 7, Wash., secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. Jo Walker, Agriculture Experiment Station, Puyallup, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W., Huntington, W. Va., secretary.

WISCONSIN—Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. George F. Lynch, 201 West Devon St., Milwaukee 17, Wis., secretary.

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New Jersey pharmaceutical firm needs veterinarian, age 25 to 35, with several years of broad experience in veterinary practice to (1) supervise experimentation, including chronic toxicity and histological studies; (2) develop new pharmacological tests involving surgical procedures; (3) maintain animal colony. Send complete resumé and salary requirements. Address "Box D 4," c/o JOURNAL of the AVMA.

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### Wanted—Veterinarians

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Veterinarians needed for small animal work in metropolitan animal hospital. Must have New York license. Address "Box D 8," c/o JOURNAL of the AVMA.

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### Wanted—Positions

German veterinarian graduated Ludwig-Maximilian at Munich, 1955 (graduates of this year are recom-

(Continued on p. 36)

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against mastitis,  
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25 Gm. disposable plastic syringe

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procaine penicillin G .....	1 million units
dihydrostreptomycin .....	500 mg.
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in a base which has been especially formulated for long-lasting effect through slow release of the active ingredients.

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New from the research department of NLC is  
COPRON 12, formulated to supply the necessary mineral  
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(CLASSIFIED ADS—continued from p. 34)

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(Continued on p. 43)



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vials of 250 mg., 500 mg., 1 Gm., and 2.5 Gm. with Water for Injection, U.S.P.†

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500 mg., scored, foil-wrapped. Folders of 2. Boxes of 5.†

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50 mg. in bottles of 25 and 100;  
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5 Gm. of oxytetracycline activity per lb.  
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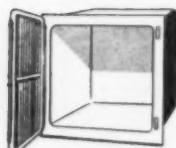
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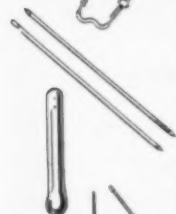
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## Correspondence

### Appreciation of Honorary Membership

At the annual meeting last year, Prof. J. Russell Greig, former director of Rowett Research Institute, Moredun, Aberdeenshire, Scotland, and Dr. Walter Ehrström, veterinary public health official, Helsinki, Finland, were elected to honorary membership in the AVMA in recognition of their outstanding contributions to veterinary medical service and the veterinary profession. Following are excerpts from letters recently received from them:

Dear Dr. Hardenbergh:

I can not properly tell you how deeply I appreciate this signal honor.

What I have tried to do for the advancement of veterinary science has been a labour of love; but this mark of honour—and such high honour—from my confreres in the North American Continent, at the end of my active working life, comes as something that I very warmly cherish.

I would ask you, please, to convey these expressions of my feelings to the Executive Board and House of Representatives of the Association.

Yours sincerely,

s/J. Russell Greig,

Wedderlie Kirk Brae, Edinburgh 9.

• • •

To the American Veterinary Medical Association:

I hereby express my deep gratitude for this rare and high honour.

Through the American veterinary literature, I have had ample opportunity to learn about the excellent organization of veterinary food control in your country and have noticed the significance you give to the control of foods of animal origin. Through your literature, the Finnish veterinarians have gotten many valuable ideas, advice and support. With gratitude and satisfaction, they note that your distinguished Association has observed and honoured the work in the field of veterinary food control in our far-away country.

Yours faithfully,

s/ Walter Ehrström,

Katariinank. 2—Helsinki.

### Schering Concludes Corticoids License Agreements

Schering Corporation, Bloomfield, N. J., has announced that all U. S. manufacturers of prednisone and prednisolone, the two new steroids now being widely used in the treatment of rheumatoid arthritis and other diseases responsive to cortisone or hydrocortisone therapy, have entered into patent—licensing agreement with them.

Schering markets prednisone under the trade name of meticorten, and the companion prednisolone as meticortelone.

# New 'Antilepto' improved

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*immunizing agent against bovine leptospirosis*

**MAJOR ADVANTAGES:** High protective titers developed within 7 days. Protection lasts at least 6 months.<sup>1</sup> Stable, potent.



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References: 1. Brown, A. L., et al.: Vet. Med. 50: 167, April 1955. 2. Agricultural Research Service, Losses in Agriculture, June 1954, Table 20, p. 129.

Veterinary Department, Sharp & Dohme  
Division of Merck & Co., Inc.  
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### For Sale or Lease—Practices

Excellent Texas practice for sale; 90% small animals. Completely equipped hospital; no real estate. Gross last year. \$24,000; \$10,000 takes all. Must sell quickly because of other interests. Address "Box D 1," c/o JOURNAL of the AVMA.

Large animal practice, real estate, and equipment for sale; small town in western Minnesota. Price, \$15,000. Address "Box C 3," c/o JOURNAL of the AVMA.

Established small animal practice for sale in New Orleans; ideal for recent graduate or man with limited capital. Purchaser is welcome to try practice out. Address "Box D 5," c/o JOURNAL of the AVMA.

Modern, well-established small and large animal practice for sale in growing community in San Francisco Bay area. Consists of large, lovely home and up-to-date, fully equipped hospital. Gross business approximately \$25,000 annually. \$55,000 includes all

real estate; \$15,000 will handle. Address "Box D 9," c/o JOURNAL of the AVMA.

Practice, clinic and home for sale in Pacific Northwest; 50% dairy, 50% pets, grossing \$18,000-\$20,000 annually with 30-day vacation. Home situated next door to clinic on main highway in town of 4,000. Clients educated to working and recreational requirements of veterinarian. Good cooperation with related medical professions. Mild climate with year-round fishing. Owners will not lease or finance. Address "Box D 12," c/o JOURNAL of the AVMA.

### Miscellaneous

Pregnancy diagnosis in mares—45th to 150th day. Request mailing tubes; \$7.00, 2 or more, \$6.00 each. Pregnancy Diagnostic Laboratories, Dysart, Iowa.

For Sale—Small animal mouth speculums. Used primarily to pass the stomach tube in dogs and cats; self-retaining, made of life-lasting plastic. Instructions included. Set of 2, \$6.00. J. & G. Mfg. Co., 1585 Moore St., Akron 1, Ohio.

Breedersleve—The disposable obstetrical sleeve. Package of 20 with detachable chest band, \$5.00; lower wholesale prices. Free sample upon request. Breeders Equipment Co., Flourtown, Pa.

X-ray unit—Campbell Animagraph—like, new condition. Included are, 3 therapy cones, foot switch, and hand timer. Originally cost over \$1,600; will sell for \$795. Address "Box D 14," c/o JOURNAL of the AVMA.

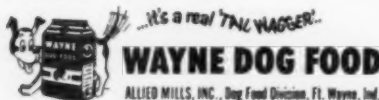
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## Cutter Acquires Haver-Glover Laboratories

On December 28, 1955, the assets and business of the 35-year-old Haver-Glover Laboratories of Kansas City, Mo., were taken over by Haver-Glover Laboratories, Inc., a wholly owned subsidiary of Cutter Laboratories of Berkeley, Calif.

Haver-Glover Laboratories was established in 1920 by Clif V. Haver and Dr. E. K. Glover with

a policy of sales to graduate veterinarians only, which brought early recognition to the firm. Doctor Glover retired from the business in 1925 to re-enter practice but Haver carried on to build a national organization with branches and distributors from coast to coast.

The strictly ethical policies of Haver-Glover Laboratories will be maintained, as were those of Ashe Lockhart, Inc., of Kansas City, Mo., which firm was acquired by Cutter Laboratories in February, 1955. Management of both companies will work closely together since Dr. Joseph Knappenberger, president of Ashe Lockhart, Inc., will also head Haver-Glover Laboratories, Inc., as president and director. Rudolph Seiden, chief chemist of Haver-Glover Laboratories since 1938, has been appointed vice president in charge of production and research. Carl Lindberg, who has represented Haver-Glover at meetings since 1931 as head of its instrument department, along with other department heads, will continue in their same capacities. Clif V. Haver, founder, will remain as member of the board of directors. Other members of the board will be: Ashe Lockhart,\* D.V.M.; Guy A. Railsback, D.V.M.; Norwood H. Casselberry, D.V.M.; Harry R. Lange; Joseph Knappenberger, D.V.M.; and Robert K. Cutter, M.D., president-elect of the American Pharmaceutical Manufacturers Association.

\*Dr. Lockhart died Jan. 11, 1956.

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In early 1955, after 42 years of continuous research and scientific endeavor, Dr. Ashe Lockhart gave up the active management of the firm which bears his name. He continued to serve on the Board of Directors and as consultant to the firm until his death on January 11 of this year.

Dr. Lockhart's contributions to veterinary scientific knowledge during those years of important developments in the field were many and are well known.

The name Lockhart has stood always for the best interests of the profession — for quality — for integrity — for "Better Biologics."

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